3 AFFECTED ENVIRONMENT

This chapter describes the baseline condition of the area of the projects for the purpose of identifying resources, ecosystems, and human communities that potentially could be affected by implementation of the alternatives described in Chapter 2. Information presented here includes geology, soils, and seismicity; water resources; climate and air quality; biological resources; cultural resources; land use; transportation; visual resources; socioeconomics; and minority and low-income populations. Information on the baseline environment for noise and human health is included in the corresponding sections in Chapter 4. The baseline condition serves as a reference point for the evaluation of impacts of the alternatives presented in Chapter 4.

3.1 GEOLOGY, PHYSIOGRAPHY, SOILS, AND SEISMICITY

3.1.1 Geology

The proposed transmission line routes and the two alternative routes would be located in the Imperial Valley, part of the Salton Trough, a structural and topographic depression that lies within the Basin and Range physiographic province. The Salton Trough is an extension of the East Pacific Rise as it emerges from the 1,000-mi (1,609-km) long trough occupied by the Gulf of California and continues northward to Palm Springs. The East Pacific Rise is a crustal spreading center characterized by a series of northwest-trending transform faults, the northernmost being the San Andreas. The tectonic activity of the East Pacific Rise has downwarped, downfaulted, extended, and laterally translated the sediments within the Salton Trough. Its underlying geologic complexity is masked by the relatively featureless surface of the basin, filled by thousands of feet of marine and nonmarine sediments (Morton 1977; Hunt 1974).

The sub-sea-level basin of the Salton Trough has received a continuous influx of sand, silt, and clay derived from the Colorado River, which created ephemeral lakes in the basin until about 300 years ago. Underlying this alluvial cover is a succession of Tertiary and Quaternary sedimentary rocks at least 20,000 ft (6,096 m) thick. These rocks are composed mainly of marine and nonmarine sandstones and clays and lake deposits. The depth to basement rock ranges from 11,000 to 15,400 ft (3,353 to 4,694 m), though metamorphism of sedimentary deposits is known to occur at depths as shallow as 4,000 ft (1,219 m) because of the high heat flows associated with crustal spreading. High heat flows also give rise to geothermal steam; several "known geothermal resources areas" have been delineated by the U.S. Geological Survey (USGS) in the Imperial Valley (Morton 1977).

The major geologic resources in Imperial County are sand and gravel. Of the 45 active mines reported by the California Department of Conservation Division of Mines and Geology (now the California Geological Survey) for 1997 through 1998, 36 (80%) were sand and gravel. Other mines in the county include gold (four), clay (two), limestone (one), fill (one), and gypsum (one) (Larose et al. 1999). While there is evidence of past small-scale mining (for sand and gravel) near the existing 230-kV IV-La Rosita transmission line (hereafter in this chapter referred to as the existing line), there is currently no active mining in this area.

3.1.2 Physiography

The Imperial Valley is a flat, alluvium-filled basin following the same northwest trend as the Salton Trough. Located in the south-central part of Imperial County, the valley has an area of about 989,450 acres (400,418 ha) in the United States and is bounded to the north by the Salton Sea and extends south into Mexico. To the east are the Algodones Dunes and Sand Hills; to the west (from north to south) are the Fish Creek Mountains, Superstition Hills, Superstition Mountain, and the Coyote Mountains (Figure 3.1-1). The Yuha Desert lies to the southwest. The Imperial Valley is separated from the Gulf of California by the ridge of the Colorado River delta, which has an elevation of about 30 ft (9 m) above mean sea level (MSL) at its lowest point (Morton 1977; Zimmerman 1981).

As recently as 300 years ago, a lake, called Lake Cahuilla, filled the Imperial Valley basin to the elevation of the Colorado River delta. The shoreline of this ancient lake has an elevation of about 35 ft (11 m) above MSL and is visible today. Between the east side of the ancient lakebed and the Algodones Sand Hills is a desert plain, called the Imperial East Mesa, a terrace of the Colorado River delta. The proposed transmission line routes are located near the Imperial West Mesa, a desert plain to the west of the ancient lakebed (Figure 3.1-1).

3.1.3 Soils

The soils within the Imperial Valley study area are formed predominantly on silty to sandy sediments within and adjacent to ancient Lake Cahuilla, with interspersions of gravels and clays transported by the Colorado River (Zimmerman 1981). For the most part, the lake deposits are deep, poorly consolidated, and subject to both water and wind erosion. Gradual deflation of these deposits has resulted in the formation of desert pavement and protopavement over large areas. Stable lake deposits appear to be especially susceptible to this process. Most of the surface formations within the project area consist of, or are overlain by, thin wind deposits derived from lake sands and silts. The softer underlying silt and clay formations are dissected by intricate drainage systems trending northward toward the Salton Sea. Ancient beach deposits can often be observed in the banks of these channels.

The proposed transmission line routes and the two alternative routes would cross two soil associations as mapped by the U.S. Department of Agriculture (USDA) Soil Conservation Service (Zimmerman 1981), now called the Natural Resources Conservation Service. These soils represent the two general kinds of landscapes in the southwestern portion of the Imperial Valley: the lake basin formerly occupied by ancient Lake Cahuilla and the mesas to the east and west of the lake basin (the western alternative route would cross soils of the Imperial West Mesa). The soils within the utility corridor already provide adequate structural support for the existing line immediately adjacent to the location of the proposed transmission line routes.

The USDA soil survey did not cover the area south of State Route 98 and west of the proposed transmission line routes; however, the soil types in these areas can be assumed to be similar. Brief summaries of the soil associations are provided below.

3.1.3.1 Meloland-Vint-Indio Association

This soil association consists of nearly level, well-drained fine sand to silt loam formed predominantly in the lake basin, floodplains, and on the low alluvial fans of the Imperial West Mesa. Natural drainage of these soils has been altered by extensive irrigation in the area and seepage of water from irrigation canals. During periods of heavy irrigation, a perched water table may be found at depths less than 60 in. (152 cm). These soils are deep (to at least 60 in. [152 cm]), low to moderately permeable, with a high to very high water capacity. The soil erosion hazard is generally slight, but soils in this unit are susceptible to blowing and to erosion during infrequent periods of intense rainfall. At higher elevations, floodwaters have created a drainage network of rills and arroyos. These soils are mainly used for farmlands but are also well suited for home sites, urban areas, and desert recreation.

3.1.3.2 Rositas Association

This soil association consists of nearly level to moderately steep (with slopes up to 30%), excessively well-drained sand to silt loam formed in the transitional area between the ancient beach line of the Lake Cahuilla basin to the middle and upper levels of alluvial fans from the Imperial West Mesa. These soils are deep (to at least 60 in. [152 cm]), highly permeable, and have a low water capacity. The soil erosion hazard is generally slight, but soils in this unit are susceptible to blowing and erosion during infrequent periods of intense rainfall. These soils are mainly used for desert recreation and wildlife habitat, but they have the potential for irrigated farming. They are also well suited for home sites and urban areas. Locally, these soils are a source of sand.

3.1.3.3 Prime Farmland

The Natural Resources Conservation Service has designated certain soil types in the Imperial Valley as “prime farmland” (if irrigated) subject to protection under the Farmland Protection Policy Act (FPPA; Public Law [P.L.] 97-98, 7 USC 4201). Among these are several soil types found in the Lake Cahuilla basin as part of the Meloland-Vint-Indio soil association: Meloland very fine sandy loam, wet; Meloland and Holtville loams, wet; Indio loam; Indio loam, wet; Indio-Vint complex; Vint loamy very fine sand, wet; Vint fine sandy loam; and Vint and Indio very fine sandy loams, wet. The Rositas silt loam (0 to 2% slopes) soil type found in the Rositas soil association in floodplains, basins, and terraces of the Imperial West Mesa also qualifies as prime farmland (California Department of Conservation 1995). Construction activities on privately owned property or within an existing ROW, such as the one through which the existing line runs, are not subject to the FPPA; however, the FPPA may apply to any route on public land outside of the existing BLM-designated Utility Corridor N.

3.1.4 Seismicity

The zone of northwest-trending strike-slip faults in the Salton Trough defines the transform boundary between the Pacific and North American plates (Figure 3.1-2). As part of this system, the Imperial Valley is a seismically active region. In the past 100 years, 5 earthquakes with a magnitude equal to or greater than 6.5 have occurred: December 30–31, 1914 (2 earthquakes with magnitudes of 6.5 and 7.1), just below the U.S.-Mexico border; May 18, 1940 (magnitude 6.7), along the Imperial Fault; October 15, 1979 (magnitude 6.6), also along the Imperial Fault; and most recently, November 24, 1987 (magnitude 6.6), along the Superstition Hills Fault. Interim seismic activity is characterized by smaller magnitude earthquake swarms (Real et al. 1979; SCEDC 2004).

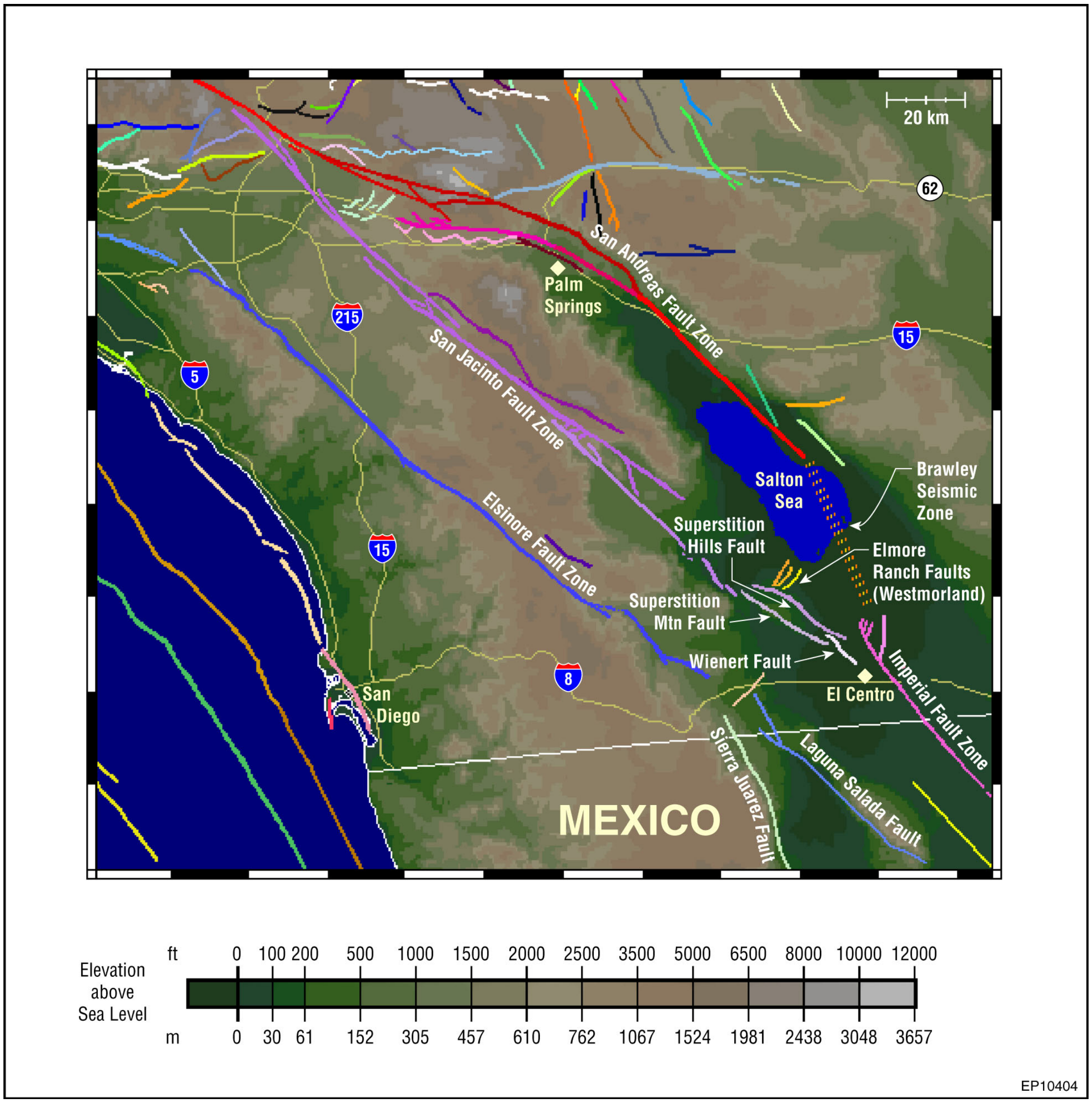

FIGURE 3.1-2 Major Fault Zones in the Salton Trough, Southern California (Source: SCEDC 2004)

The proposed transmission line routes and the two alternative routes would lie between the Laguna Salada Fault (about 9 mi [14 km] west), the Superstition Hills Fault (about 9 mi [14 km] northeast), and the Imperial Fault (about 14 mi [23 km] east) (Figure 3.1-2). In recent history, the Imperial Fault has had the most activity. Earthquakes along this fault have produced surface rupture (i.e., breakage of the ground) along the surface trace of the fault and offsets as great as 15 ft (4.6 m) (SCEDC 2004).

3.2 WATER RESOURCES

Water resources associated with the transmission line projects include surface water, wetlands, floodplains, and groundwater.

3.2.1 Surface Water Resources

The proposed routes and the two alternative routes for the projects lie within the Imperial Valley, California, and the Colorado Desert. Very high summer temperatures, low precipitation, and high evaporation rates produce an extremely arid environment. Imperial Valley, California, has an average annual rainfall of about 3 in. (8 cm) (Setmire 2000). Under these conditions, surface water is scarce. The only surface water resource that would be directly affected by the projects is the New River. Indirect impacts would affect the Salton Sea and a pilot wetland project (at Brawley) along the New River. No natural wetlands occur along the New River (Barrett 2004).

The following sections present background information on the New River, the Zaragoza Oxidation Lagoons, Salton Sea, and the Brawley wetland. This information is used in Section 4.2 to evaluate the environmental impacts of the projects to surface water resources in the United States. The Zaragoza Oxidation Lagoons, a man-made feature, are part of the plants' operating systems (as described in Chapter 2). They are discussed in this section because they are also a source of water for the New River.

3.2.1.1 New River

3.2.1.1.1 Physical Conditions. The New River originates about 15 mi (24 km) south of Mexicali, Mexico, and flows 60 mi (97 km) northward through Imperial County, California, to the Salton Sea (EPA 2003b). The channel of the New River was formed between October 1905 and February 1907, when high waters following summer flooding in the Colorado River breached a temporary diversion that had been designed to bypass a silted-up section of the Imperial Canal (Setmire 2000; CRBRWQCB 1998a). Water from the diverted Colorado River flowed for about 18 months, creating the New River and the Salton Sea. The breach created a channel that was 40 to 60 ft (12 to 18 m) deep, with a width of about 1,800 ft (549 m) (IID 2003c).

The New River flows north through Mexicali, crosses the U.S.-Mexico border at Calexico, California, and then flows northward through Imperial County to the Salton Sea (DHHS 1996; EPA 2003b). As it flows northward from Calexico, it passes through Seeley, Imperial, Brawley, and Westmorland, California (Figure 3.2-1).

In Mexico, the New River is reportedly used for bathing, drinking, household chores, and irrigation of crops (DHHS 1996). In the United States, water in the New River is used for agriculture via irrigation, and recreation. It is not used as a source of drinking water. Recreational activities include waterfowl hunting, fishing, and frog catching (DHHS 1996). Beneficial uses of the New River include freshwater replenishment; industrial surface water supply; preservation of rare, threatened species; water contact and noncontact recreation; warm freshwater habitat; and wildlife habitat (EPA 2003c).

Within the United States, the channel of the New River has a maximum width of about 3,500 ft (1,067 m) (CRBRWQCB 1998a). Recent USGS measurements at Calexico, California, indicate that the New River has a width of about 40 ft (12 m); at Westmorland, California, its width is about 95 ft (30 m) (USGS 2003a,b). The depth of the water depends on its flow. At the Calexico gage, between 1983 and 2003, the depth of water (i.e., stage) ranged from about 8 to 15 ft (2.4 to 15 m) (USGS 2003c).

The annual mean flows for the New River at USGS gages (10254970) at Calexico and Westmorland (10255550), California, are listed in Table 3.2-1 and shown in Figure 3.2-2. Between the U.S.-Mexico border and the gage near Westmorland, the New River gains in flow because of agricultural runoff and wastewater discharge. The mean flow at the Calexico gage is approximately 180,000 ac-ft/yr (7.04 m^3/s) for the period of record 1980 through 2001; the mean flow at Westmorland, California, for the same period is about 463,000 ac-ft/yr (18.10 m^3/s). As Table 3.2-1 and Figure 3.2-2 indicate, flow at these gages varies from year to year. The variability of the flow at Calexico, California, is about 46,000 ac-ft/yr (1.80 m^3/s); the variability at Westmorland, California, is about 31,000 ac-ft/yr (1.21 m^3/s). Minimum flows recorded for the Calexico and Westmorland gages for the period of record 1980 through 2001 were about 118,000 and 412,000 ac-ft/yr (4.62 and 16.11 m^3/s), respectively; maximum flows were about 264,000 and 513,000 ac-ft/yr (10.33 and 20.06 m^3/s), respectively (Table 3.2-1).

Figures 3.2-3 and 3.2-4 show depth/flow curves derived from the USGS data. These curves estimate the correlation between water depth and flow. A linear regression model was applied to the data to reduce its variability. The regression line shown in Figure 3.2-3 for the Calexico gage, along with its equation and R^2 coefficient (coefficient of determination; an R^2 value of 0.0), indicates that knowledge of variable *X* (in this case, flow) does not help in predicting value *Y* (in this case, the depth of the water); an R^2 value of 1.0 indicates that all *Y* values are perfectly predicted from knowledge of *X*; that is, *Y* lies on a straight line with no scatter. For a mean flow of 180,000 ac-ft/yr (7.04 m^3/s), the depth of the water in the New River at the Calexico gage calculated with the linear regression model is approximately 9.5 ft (2.9 m). For a standard deviation of 45,600 ac-ft/yr (1.78 m^3/s), the elevation of the water for a flow equal to the mean flow value minus one standard deviation 135,380 ac-ft/yr (5.30 m^3/s) would be about 9.0 ft (2.7 m), a difference of 0.5 ft (0.15 m) from calculated mean-flow conditions.

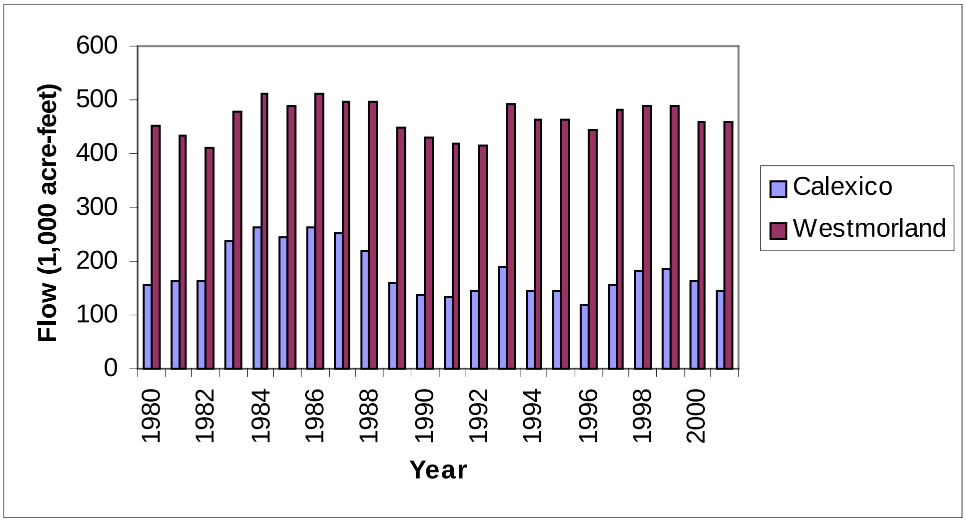

FIGURE 3.2-2 Annual Mean Flow in the New River at Calexico and Westmorland, California, 1980–2000 (Source: USGS 2003a,b)

At the Westmorland gage, shown in Figure 3.2-4, the depth of the water ranges from about 4.6 to 7.4 ft (1.4 to 2.3 m) for a flow that ranged from about 260,600 to 680,500 ac-ft/yr (10.19 to 26.61 m^3/s) over the period of record 1993 through 2003 (USGS 2003d). Because the depth/flow data have short-scale variability, similar to that observed in the data for the Calexico depth/flow data, a linear regression model was again applied. Figure 3.2-4 shows the regression line for the model, its equation, and R^2 value. For a mean flow of 463,340 ac-ft/yr (18.12 m^3/s), the depth of the water calculated, using the linear regression model of the data, is about 6.0 ft (1.8 m). For a standard deviation of 31,130 ac-ft/yr (1.22 m^3/s), the depth of the water for a flow equal to the mean value minus one standard deviation calculated with the linear regression model is about 5.8 ft (1.8 m), a difference of 0.2 ft (0.1 m) from mean-flow conditions.

3.2.1.1.2 Water Quality. Water quality in the New River is, in general, poor. Pollution sources include agricultural drainage (both tailwater [i.e., surface water that drains from the low end of an irrigated field when the amount of water added to the field exceeds the infiltration capacity of the soil] and tilewater [i.e., subsurface water that drains via tiles from an irrigated field]); industrial and residential wastewater from Mexicali, Mexico, and the Imperial Valley in California; and runoff from confined animal feeding operations and industrial and household "dumps" along the river.

Maquiladoras are sources of New River pollution in Mexicali (Pauw 2003). A maquiladora is a Mexican corporation that operates under a maquila (Mexican In-Bond) program approved by the Mexican Secretariat of Commerce and Industrial Development

Tiles

Man-made subsurface drains remove excess water from soil, usually through a network of perforated tubes installed 2 to 4 ft (0.6 to 1.2 m) below the soil surface. These tubes are commonly called "tiles" because they were originally made from short lengths of clay pipes.

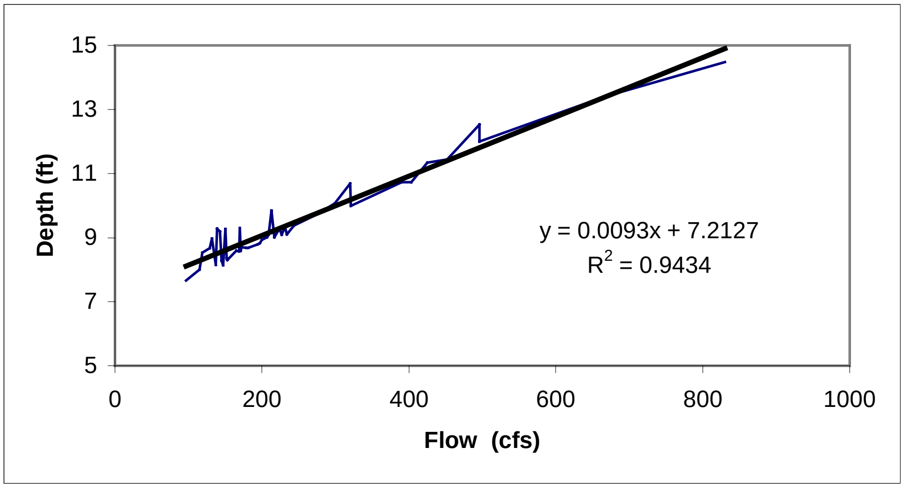

FIGURE 3.2-3 Depth/Flow Relationship for the Calexico Gage (to convert ft^3/s to m^3/s, multiply by 0.02832)

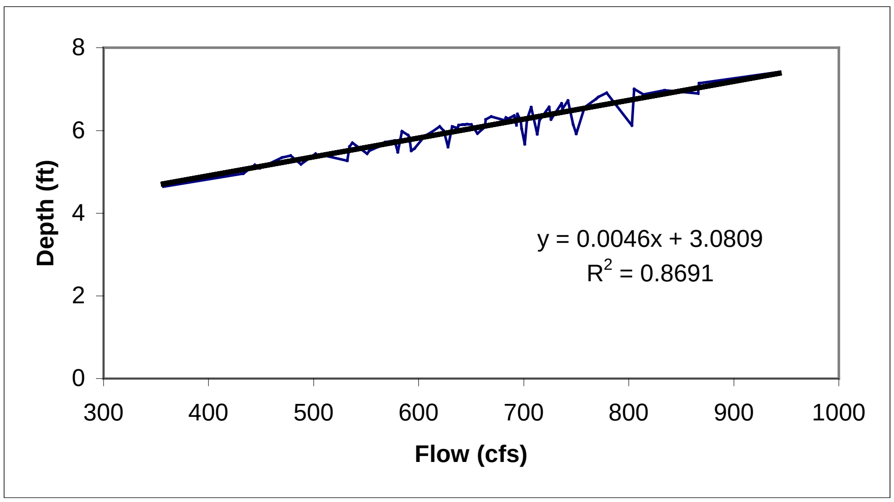

FIGURE 3.2-4 Depth/Flow Relationship for the Westmorland Gage on the New River (to convert ft^3/s to m^3/s, multiply by 0.02832)

(Baz 2003). Many of these industries discharge untreated wastewater into rivers daily (American Rivers 2003). Additional pollution from south of the U.S.-Mexico border comes from the operation of two wastewater treatment lagoon systems in two water treatment districts (Mexicali I and II) in the Mexicali metropolitan area (Figure 3.2-5). These systems are organically and hydraulically overloaded because of large local municipal sewage flows. Because of the lack of treatment capacity and an inadequate and aging collection system, Mexicali discharges 5 million to 20 million gal/d (18.9 million to 79.7 million L/d) of untreated municipal wastewater into the New River (CRBRWQCB 2004b).

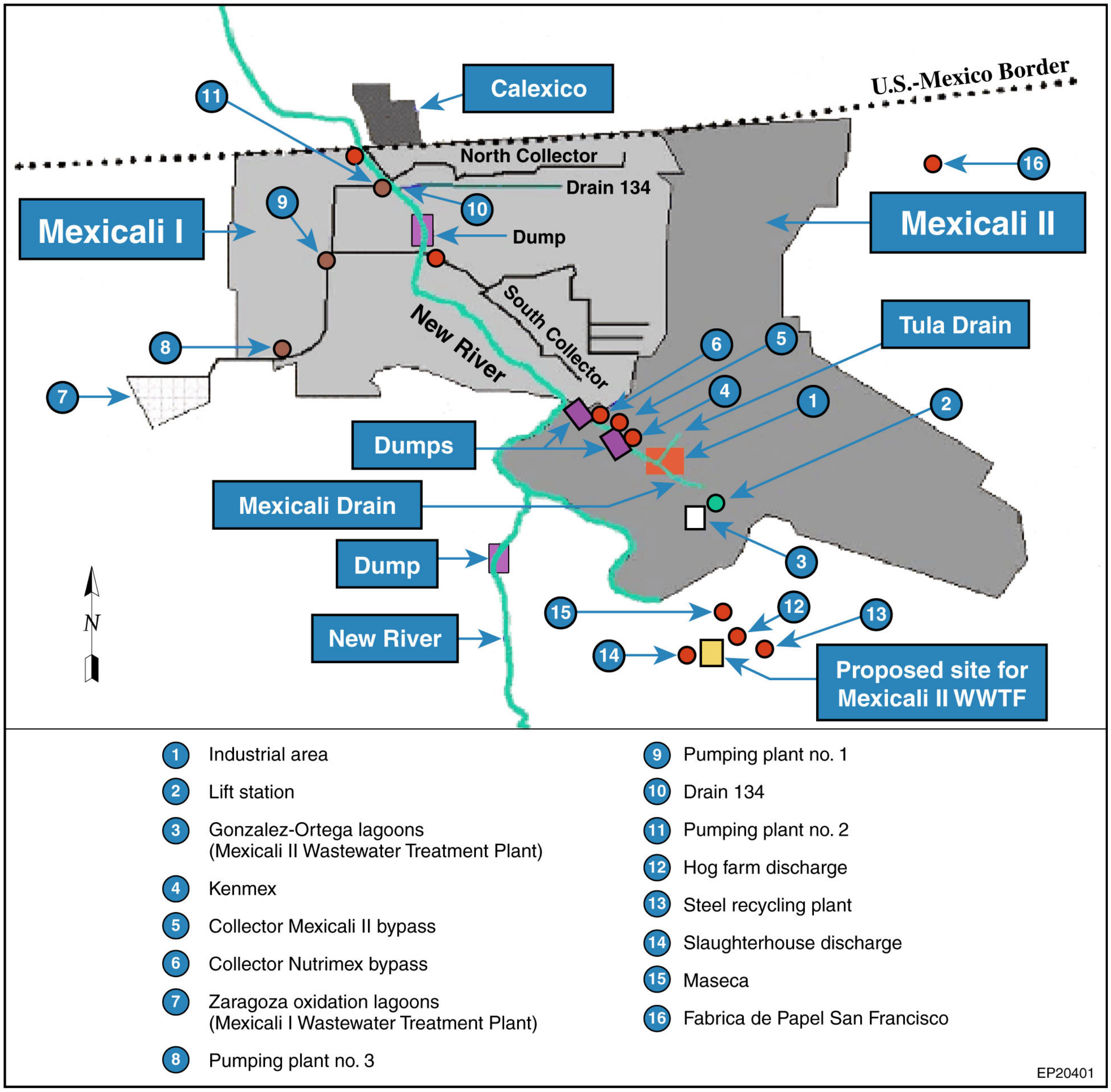

FIGURE 3.2-5 The New River in Mexicali, Mexico (Source: CRBRWQCB 2004c)

In the United States, the New River receives urban runoff, agricultural runoff, treated industrial wastes, and treated, disinfected, and nondisinfected domestic wastes from the Imperial Valley (University of California 2003). It also receives about 8,000 ac-ft (9.9 million m^3) of treated wastewater per year from eight National Pollutant Discharge Elimination System (NPDES) Imperial Valley wastewater treatment facilities. Of these facilities, three discharge disinfected effluent (approximately 4,100 ac-ft [5.1 million m^3]), and five discharge about 3,800 ac-ft (4.7 million m^3) of nondisinfected effluent (CRBRWQCB 2003e).

Environmental sampling of the New River has been performed at the U.S.-Mexico border since 1969; additional sampling has been performed between the U.S.-Mexico border and the

Salton Sea. Many agencies, including the USGS, the California Regional Water Quality Control Board, the California State Water Resource Control Board, and the California Department of Fish and Game, have sampled water from the New River.

Contaminants of concern detected in water samples from the New River at the U.S.-Mexico border that exceeded comparison values set by the Agency for Toxic Substances and Disease Registry include pathogens (e.g., fecal coliform bacteria, fecal streptococci, *E. coli* bacteria, and enterococci bacteria), metals (e.g., lead, arsenic, cadmium, thallium, antimony, boron, and manganese), pesticides (e.g., aldrin, chlordane, dichlorodiphenyldichloroethane [DDD], 4,4’-DDD, dichlorodiphenyldichloroethylene [DDE], dichlorodiphenyltrichloroethane [DDT], and heptachlor epoxide), and volatile organic compounds (VOC) (e.g., tetrachloro-ethylene [TCE], methylene chloride, and *n*-nitrodiphenylamine) (DHHS 1996).

For the present study, water quality parameters of interest include salinity, selenium, total phosphorus, BOD, COD, and TSS. These parameters are of interest because operation of the power plants could increase the salinity and the selenium concentration in the New River and decrease the concentrations of the other constituents because of water treatment (Section 4.2).

Salinity. Salinity is a measure of the number of grams of material (salts) dissolved in a number of grams of water. Salinity is often referred to as total dissolved solids (TDS) and is usually expressed in units of milligrams of dissolved salts per unit volume of water (mg/L).[1] Because 1 L of water weighs 1,000 g, 1 mg/L is the same as 1 ppm. Important salts associated with the New River include chloride, sodium, magnesium, calcium, carbonate, bicarbonate, nitrate, and sulfate (University of California 2003). The primary source of salts in waters is from chemical weathering of earth materials, such as rocks and soils. Other sources of salts include salt flushing (passing clean irrigation water through soil to reduce its salt content), chemical fertilizers, animal wastes, and sewage sludges and effluents (University of California 2003).

From January 1997 through April 2003, the Colorado River Basin Regional Water Control Board[2] collected samples of river water at the Calexico gage at the U.S.-Mexico border (CRBRWQCB 2003b). Monthly measurements of the TDS concentration for the New River water at the Calexico gage at the U.S.-Mexico border are shown in Figure 3.2-6. The mean TDS concentration for the period of record is about 2,620 mg/L. This value is less than the 4,000-mg/L annual average established as a water quality objective for the Colorado River basin (see Section 3.2.1.1.3). The variability of the TDS concentration is about 315 mg/L. Most of this salinity is derived between Mexicali and the U.S.-Mexico border. As a point of reference, the mean salinity of the Colorado River, the primary source of water in the New River, is about 650 to 700 mg/L (University of California 2003).

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1 One milligram (mg) is equal to 0.001 g; one microgram (µg) is equal to 0.000001 g.

2 The Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) is one of nine regional water quality boards (collectively known as the California Regional Water Quality Control Board) that regulate most of the water-related projects in California. These agencies are managed under the State Water Resources Control Board (SWRCB), located in Sacramento, California, which is part of the California EPA (Cal/EPA).

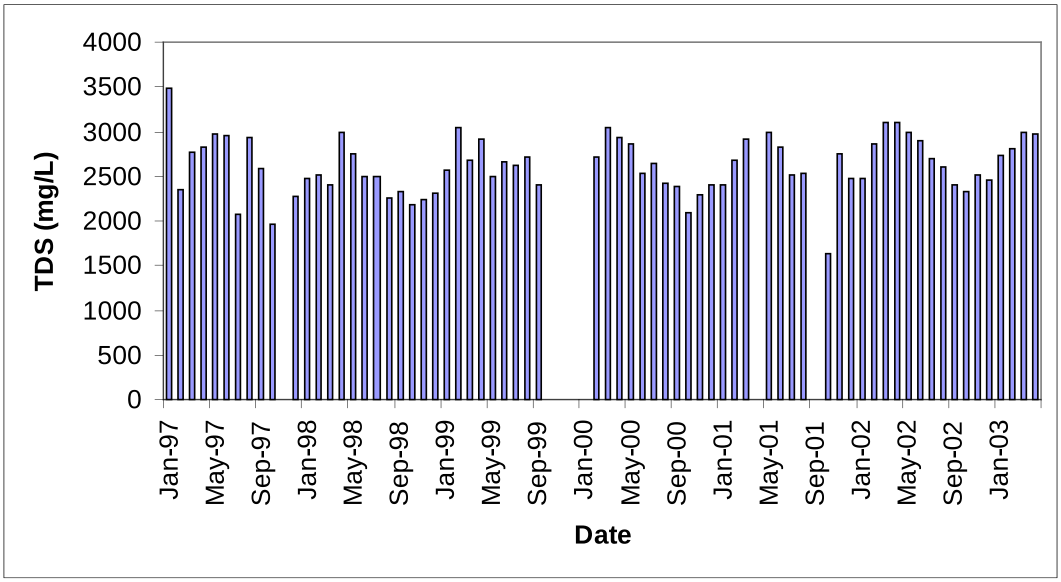

FIGURE 3.2-6 TDS (mg/L) Concentration at the Calexico Gage on the New River (Source: CRBRWQCB 2003a)

As with flow, TDS in the New River increases in the downstream direction. Twenty-seven TDS measurements were made at the New River outlet to the Salton Sea between January 1996 and March 1998 (IID 2002). TDS ranged from about 2,320 to 3,800 mg/L, with an average concentration of about 2,770 mg/L. This value is 150 mg/L greater than the average concentration at the Calexico gage. The variability of the TDS measurements were approximately 361 mg/L. All of these values are below the 4,000-mg/L annual average for the Colorado River Basin water quality objectives (see Section 3.2.1.1.3).

Selenium. Selenium is an essential nutrient for humans and animals. When consumed in amounts greater than the amounts needed for good nutrition, selenium can be toxic. Selenium is naturally occurring in the environment and is usually found in a compound form. Plants can readily take up selenium compounds from water and concentrate them. This effect is particularly important for fish and birds that eat fish.

Selenium measurements have been made for a number of years at the U.S.-Mexico border. Table 3.2-2 lists the values recorded for the past 6 years (1997 through 2003) by the Colorado River Basin Regional Water Quality Control Board. As indicated in Table 3.2-2, selenium was not detected (the reporting limit was 0.005 mg/L). In 2002, regular monthly detections occurred. These detections may have occurred either because smaller detection limits were used during sample analysis, or the method of reporting the results changed (E.S. Babcock and Sons, Inc., Laboratory replaced Department of Health Services - Southern California Laboratory for analytical work for most of the water sampling analysis during 2002). The average concentration for selenium based solely on detected values was about 0.021 mg/L. The standard deviation of sample concentrations was also about 0.021 mg/L, indicating variability in the dataset.

TABLE 3.2-2 Selenium Concentrations (μg/L) in New River Water at the U.S.-Mexico Border

	1997	1998	1999	2000	2001	2002[b]	2003
January	ND[a]	ND	ND	ND	ND	ND	ND
February	ND	ND	ND	ND	ND	11	ND
March	ND	30	ND	ND	ND	22	ND
April	ND	ND	ND	ND	ND	9.2	ND
May	ND	ND	ND	ND	ND	20	NA[c]
June	21	ND	ND	ND	ND	14	NA
July	ND	ND	ND	ND	ND	7.3	NA
August	ND	ND	ND	ND	ND	13	NA
September	37	ND	ND	ND	NA	72	NA
October	ND	ND	ND	ND	ND	ND	NA
November	ND	ND	ND	ND	ND	ND	NA
December	ND	ND	ND	ND	ND	ND	NA

[a] ND = nondetect; reporting limit = 5 μg/L.

[b] Detection limits in 2002 were 5 μg/L (0.005 mg/L).

[c] NA = not available.

Source: CRBRWQCB (2003a).

The EPA maximum contaminant level (MCL) for selenium is 0.05 mg/L or 50 μg/L (EPA 1996). Thus, the average value of the selenium concentration for the New River at the U.S.-Mexico border is less than the MCL for this contaminant. Because the New River is not a source of drinking water, comparison with an MCL is very conservative.

Maximum Contaminant Level

The U.S. Environmental Protection Agency (EPA) has determined maximum contaminant levels (MCLs) that are allowable in water systems. MCLs have been determined for a wide range of pollutants ranging from metals to volatile organic compounds. Complete lists of pollutants and their MCLs are published by the EPA.

TSS, BOD, COD, and Phosphorus. In addition to salinity and selenium, other important water quality parameters for the New River are TSS, BOD, COD, and total phosphorus. Excess sediment in the water column (i.e., TSS) and in bottom deposits threatens many aquatic and terrestrial organisms that use New River habitat. BOD and COD deplete the quantity of oxygen available in the water. TSS, BOD, and COD concentrations, reported in mg/L, for 1997 through April 2003 are shown in Figures 3.2-7 through 3.2-9, respectively. Yearly averages and total yearly loads for these parameters are given in Table 3.2-3 and shown in Figure 3.2-10. These calculations use average quantities for the flow in the river and the average annual pollutant concentrations. For the period of record, TSS and BOD appear to have remained about constant. COD appears to be increasing with time. This type of increase is probably the result of additional industrial discharge to the river.

The concentration of total phosphorus in water in the New River is a concern because it is an important biological nutrient for the river, and it is a limiting nutrient for the Salton Sea (Section 3.2.1.3). Excess phosphorus leads to eutrophication of the waterbody. Figure 3.2-11 shows the concentration of total phosphorus at the Calexico, California, gage from 1997 through 2003. Figure 3.2-12 shows the annual total quantity of phosphorus transported by the New River for 1997 through 2001. The total quantity of phosphorus transported past the Calexico gage has been fairly constant and averages about 450 tons/yr (402 t/yr). The average total phosphorus concentration for 1997 through 2003 is about 2.0 mg/L (2 ppm). Phosphorus has no Safe Drinking Water Act guidelines, MCL, or secondary MCL (SMCL) (EPA 1996). However, to prevent eutrophication, the EPA recommends that phosphates should not exceed 0.025 mg/L in lakes, 0.05 mg/L where streams enter lakes, and 0.1 mg/L in streams that do not flow into lakes (University of California, Davis 2003). To prevent excessive plant growth that becomes a nuisance or adversely affects beneficial uses of the water, a 0.1-mg/L total phosphorus guideline has often been applied (e.g., CRBRWQCB 2003d). The average total phosphorus concentration at the Calexico gage exceeds all of these recommended values.

Total Suspended Solids

Total suspended solids (TSS) is the concentration of TSS in a water system. Suspended solids increase the turbidity of the water, degrade its quality, and impact the following beneficial uses: warm freshwater habitat; wildlife habitat; preservation of rare, endangered and threatened species; freshwater replenishment; and both contact and noncontact recreation. A total maximum daily load (TMDL) for New River suspended solids has an ultimate maximum TSS goal of 200 mg/L.

Biochemical Oxygen Demand

The biochemical oxygen demand (BOD) is a measure of the amount of oxygen consumed by microorganisms decomposing organic matter in stream water. A higher BOD value indicates a smaller amount of dissolved oxygen (DO) in rivers and streams that is available to higher forms of aquatic life.

Chemical Oxygen Demand

The chemical oxygen demand (COD) measures the total amount of oxidizable (biodegradable and nonbiodegradable) compounds in natural and wastewaters in terms of the equivalent amount of oxygen required to oxidize them. In a natural setting, oxygen depletion results from metabolic processes and contributes to the process of eutrophication.

Dissolved Oxygen. The quantity of dissolved oxygen (DO) in the river increases with distance from the U.S.-Mexico border due to reaeration and self-purification. In summer, depressed oxygen levels extend 26 mi (42 km) downstream of the U.S.-Mexico border (i.e., north toward the Salton Sea), making water quality too poor to support a diverse fish population (Setmire 1984).

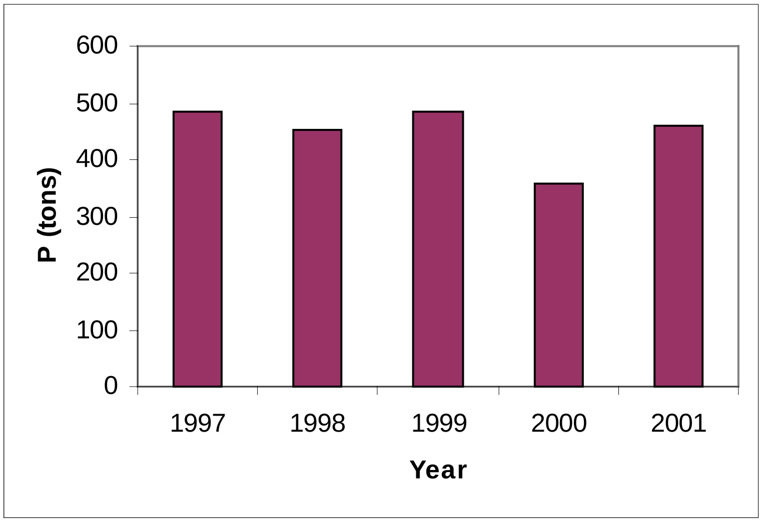

FIGURE 3.2-12 Annual Total Quantity of Phosphorus at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

Temperature. The water temperature in the New River at the Calexico gage has not been recorded regularly since 1981 (USGS 2003c). Between September 26 and September 30, 1977, the water temperature at the Calexico gage was 76.1°F (24.5°C) (Setmire 1984). The average temperature of water discharged from the TDM power plant for the period June through November 2004 was 79.2°F (26.2°C) (Henao 2004). The range of temperatures was 66.0 to 94.5°F (18.9 to 34.7°C). Water temperatures in effluent from the Zaragoza Oxidation Lagoons averaged 70.7°F (21.5°C) for the period August 2000 through June 2004 (Kasper 2003). The range of effluent temperature was 49.1 to 89.6°F (9.5 to 32°C).

Phosphorus

Phosphorus is one of the key elements needed for plant and animal growth. Phosphates, PO_4^{-2}, are formed from elemental phosphorus and oxygen. Phosphates occur in three forms: orthophosphates, produced from natural processes and found in sewage; polyphosphates, found in detergents; and organically bound phosphate, produced from organic pesticides. The sum of all phosphorus-containing compounds is referred to as total phosphorus. Excess phosphorus can lead to eutrophication.

Eutrophication

Eutrophication is a process whereby water bodies, such as lakes, estuaries, or slow-moving streams and rivers, receive excess nutrients (phosphorus and nitrogen) that stimulate excessive plant growth (algae, periphyton-attached algae, and nuisance plants). This enhanced plant growth, often called an algal bloom, reduces DO in the water when dead plant material decomposes and can cause other organisms, such as fish, to die. If the quantity of total phosphorus or nitrogen exceeds the other, the nutrient with the lesser concentration controls the degree of eutrophication and is called limiting.

3.2.1.1.3 Water Quality Guidance for the New River. In evaluating impacts of operations of the proposed projects, pre- and postoperation water quality concentrations are compared with each other and with existing guidance (Section 4.2). The following section discusses applicable regulations, standards, and guidelines for salinity, selenium, TSS, BOD, COD, and phosphorus for the New River. These are in the forms of total maximum daily loads (TMDLs), EPA MCLs, EPA SMCLs, Salton Sea water quality objectives, and Colorado River Basin water quality objectives.

Dissolved Oxygen

Dissolved oxygen (DO) is the concentration of dissolved oxygen in a water system; it serves as an indicator of the existing water quality. DO is important to fish and other organisms living in the water and sediments. Low levels of DO indicate an impaired system. A draft Total Maximum Daily Load (TMDL) for the New River establishes a minimum DO of 5.0 mg/L.

Water Quality: Load vs. Concentration

The concentration of a material is the mass of the material per unit volume of water. Load is the quantity of material passing a given point in a specified period of time (usually 1 year). If the concentration of a material remains constant over a 1-year time period, its annual load is given as the product of its concentration, flow, and a time of 1 year.

Section 303(d)(a)(1) of the CWA requires State agencies (in this case, the Colorado River Basin Regional Water Quality Control Board) to identify the region's waters that do not comply with water quality standards applicable to such waters; rank the impaired water bodies taking into account, among other criteria, the severity of the pollution and the uses made of such waters; and establish TMDLs for those pollutants causing the impairments (SWRCB 2003). As used here, load is the weight per unit of time of a substance passing a point. A TMDL is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards and ensure that impaired waters attain their beneficial use. For assessments, a TMDL is the sum of the individual waste load allocations for point sources of pollution, the load allocations for nonpoint pollution sources, and the contribution from background sources of pollution.

In 1998, the Colorado River Basin Regional Water Quality Control Board adopted Resolution 98006, which placed the New River on its list of impaired waters. Impairment of the New River was associated with sedimentation/siltation (including TSS and turbidity), pesticides, bacteria, nutrients, and VOC (SWRCB 2003).

The Colorado River Basin Regional Water Quality Control Board submitted a sedimentation/siltation TMDL to the EPA in May 2002 (CRBRWQCB 2002b); the EPA approved it in March 2003. Similarly, a New River pathogens TMDL for fecal coliform bacteria, *E. coli*, and enterococci bacteria was submitted to the EPA in March 2002 and approved in August 2002 (CRBRWQCB 2004b). TMDLs for the New River for DO, BOD, and COD have been drafted by the Colorado River Basin Regional Water Quality Control Board and are currently under review (CRBRWQCB 2004c). Concentrations of DO, BOD, and COD violate numeric standards in the Water Quality Control Plan for the Colorado River Basin (Basin Plan) and narrative standards in Minute No. 264 of the Mexican-American Water Treaty (CRBRWQCB 2004c). This TMDL would set a minimum DO concentration of 5.0 mg/L for the river and limit the BOD and COD releases to the river. Additional TMDL numeric targets for bacteria, nutrients, pesticides, and VOC are under development (EPA 2003a).

Selenium was not included in the EPA list of anticipated TMDLs for the New River; however, it is being considered as part of a Federal TMDL for the Colorado River Watershed. The EPA has established that the drinking water MCL is 0.005 mg/L (CRBRWQCB 2002b; EPA 1996). Salton Sea objectives that apply to selenium for the New River, as a tributary to the

Salton Sea, include (1) a 4-day average value of selenium that shall not exceed 0.005 mg/L, and (2) a 1-hour average value of selenium that shall not exceed 0.02 mg/L (CRBRWQCB 2002c).

As with selenium, no TMDLs have been established for salinity or total phosphorus for the New River. However, an annual average salinity of 4,000 mg/L and an upper bound of 4,500 mg/L have been established as water quality objectives, excepting discharges from agricultural sources (SWRCB 2003).

3.2.1.2 Zaragoza Oxidation Lagoons

The Zaragoza Oxidation Lagoons, described in Chapter 2 (see also Figure 2.2-17), are located in the northwest section of Mexicali, Mexico, and are used to treat wastewater from the Mexicali I district, which has a population of about 500,000 people. The treatment plant has a total design capacity of 22.4 million gal/d (84.8 million L/d). Because of a smaller than anticipated BOD load, the plant has an existing capacity of about 27.4 million gal/d (103.7 million L/d). The current flows entering the headworks of the treatment plant are at about full capacity (27.4 million gal/d [103.7 million L/d]) (EPA 2003b).

The average flow of water discharged from the Zaragoza Oxidation Lagoons to the discharge canals and subsequently to the New River is about 33,200 ac-ft/yr (1.30 m^3/s), which exceeds the full-capacity of the lagoons (30,694 ac-ft/yr or 1.20 m^3/s) (Henao 2004). This value is about 20% of the average flow in the New River at the Calexico gage. Water released from the Zaragoza Lagoons is untreated or partially treated sewage water. Concentrations for TDS, TSS, BOD, COD, selenium, and total phosphorus for influent and effluent at the lagoons are provided in Table 3.2-4. The concentration ranges for these parameters (i.e., high versus low) tend to be large.

3.2.1.3 Salton Sea

3.2.1.3.1 Physical Conditions. The Salton Sea is situated in the Salton Trough near the Gulf of California in Riverside and Imperial Counties, California. The Salton Sea is located about 35 mi (56 km) north of the border between Mexico and the United States and about 90 mi (145 km) east of San Diego. In the geological past, the Sea was part of the Gulf of California; it is now separated from the Gulf by a delta created by the Colorado River. The Colorado River has flowed north across this delta forming large, temporary lakes about every 400 or 500 years (Laflin 1995). From 1824 until 1904, the Colorado River flowed into the Salton Basin many times (Salton Sea Authority 2003a), including 1840, 1849, 1852, 1859, 1867, and 1891 (Krantz 2002). The temporary lakes formed by the floodwaters dried up when the Colorado River again flowed south to the Gulf. The last large lake that formed was ancient Lake Cahuilla; it covered about 2,100 mi^2 (5,440 km^2). Evidence of an ancient shoreline suggests that Lake Cahuilla occupied the basin until about 300 years ago (BOR 2003a).

The Salton Sea was formed between 1905 and 1907 when floodwaters in the Colorado River breached a temporary diversion of a silted-up section of the Imperial Canal and flowed into the Salton Trough rather than to the Gulf. Flooded areas in 1905 through 1908 are shown in Figure 3.2-13. The Salton Basin, below an elevation of –226 ft (–67 m) MSL, was designated as an agricultural sump in 1928 under Executive Order of Withdrawal (Public Water Reserve No. 114, California No. 26) (CRBRWQCB 2003b) to receive agricultural drainage water. When formed, the Sea had an elevation of –195 ft (–59 m) MSL, with a surface area of about 520 mi^2 (1,347 km^2) (Ponce et al. 2003). The surface of the Sea began to drop until the 1930s, when agricultural drainage inflows from the nearby developing Imperial and Coachella Valleys sustained the Sea's level (BOR 1999). From the 1930s to the 1960s, the level of the Sea increased slowly (Figure 3.2-14). Since 1980, the level of the Sea has been fairly constant, with a balance between inflow and evaporation.

TABLE 3.2-4 Influent and Effluent Concentrations for the Zaragoza Oxidation Lagoons, 2000–2003

Parameter	Average	Low	High
Influent (mg/L)			
TDS	1,147	816	1,404
TSS	192	42	772
BOD	217	67	386
COD	528	335	836
Selenium[a]	0.001[b]	ND[c]	0.0021
Total phosphorus[a]	4.5	ND	9.5
Effluent (mg/L)			
TDS	1,170	944	1,872
TSS	59	14	132
BOD	44	4	99
COD	162	110	210
Selenium[a]	0.0011[b]	ND	0.0026
Total phosphorus[a]	4.3	0.10	8.2

[a] Source: Kasper (2003).

[b] Value represents an average of results with detectable levels of selenium.

[c] ND = not detected.

Currently, the Salton Sea is about 35 mi (56 km) long and from 9 to 15 mi (14 and 24 km) wide. It covers about 360 mi^2 (932 km^2) and has about 105 mi (169 km) of shoreline (IID 2003c). The saline lake lies within a closed basin (Salton Sink, also known as the Salton Basin) and has no outlets. Its surface is about –227 ft (–69 m) MSL. At its deepest, the Sea has a depth of about 50 ft (15 m) (about –278 ft [–85 m] MSL); its average depth is about 30 ft (9 m) (–258 ft [–79 m] MSL) (Ponce et al. 2003). With a volume of about 7.53 million ac-ft (9.3×10^9 m^3), it is the largest inland body of water in California. The northern portion of the Sea is referred to as the North Basin; the southern portion is referred to as the South Basin.

The principal resource values of the Salton Sea are based on its recreational and wildlife uses and support of agricultural activities in the Coachella and Imperial Valleys. Recreational uses include fishing, boating, swimming, camping, sightseeing, and birding. Wildlife uses include aquatic habitat for organisms (e.g., microorganisms, plants, invertebrates, and fish) and terrestrial habitat, primarily for waterfowl. The Sea is host to State park and recreation areas and State and Federal wildlife refugees. For example, the Sonny Bono Salton Sea National Wildlife Refuge (formerly Salton Sea National Wildlife Refuge), located on the southern end of the Salton Sea, includes 35,484 acres (14,360 ha) of salt marsh and open water, as well as 2,000 acres (809 ha) of agricultural fields and freshwater marsh (USFWS 2003a).

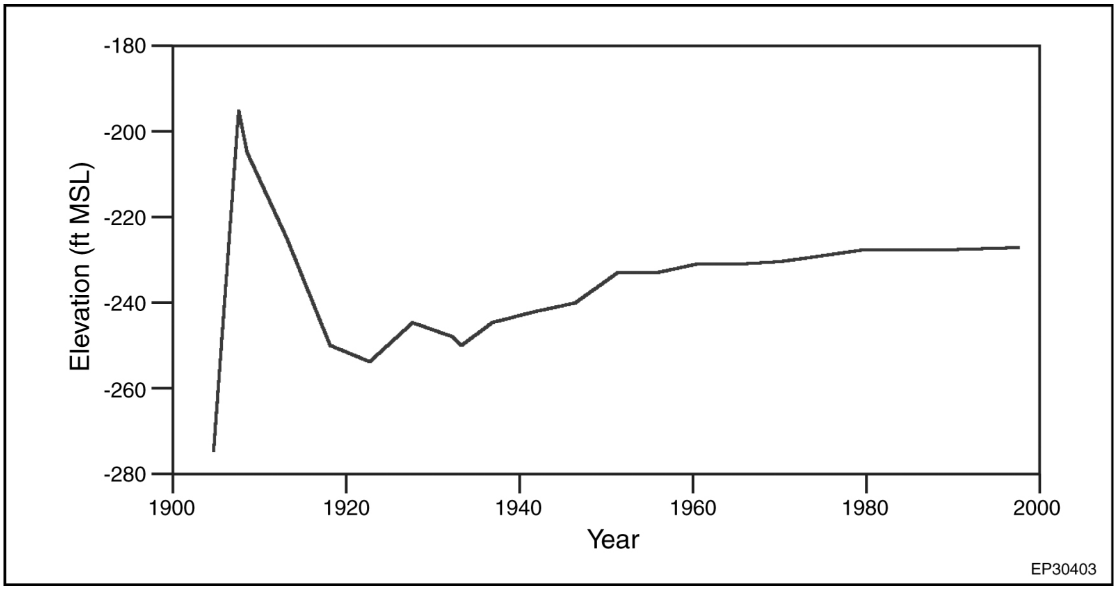

FIGURE 3.2-14 Elevation of the Salton Sea from 1905 to 2001 (Source: adapted from BOR 2001)

The Salton Sea provides agricultural support in the Coachella and Imperial Valleys primarily by serving as a drainage basin for agricultural runoff. In addition, the Sea assists with flood control in upstream communities by serving as a repository for stormwater runoff. The bed and surrounding area of the Salton Sea are relatively flat. Small changes in the volume of the Sea make large differences in the Sea's area (Figure 3.2-15) and volume (Figure 3.2-16). A decrease of 1 ft (0.30 m) in depth, for an initial elevation of –227 ft (–69 m) MSL, would produce a surface area change of approximately 2,140 acres (about 866 ha) (Weghorst 2001) and a decrease of about 233,000 ac-ft (2.9×10^8 m^3) of water.

Inflow to the Salton Sea comes from the Alamo River, New River, Whitewater River, IID agricultural drains, Salt Creek, San Felipe Creek, groundwater, precipitation, and overland flow. For the period of record 1950 through 1999, the mean inflow to the Salton Sea was approximately 1.34 million ac-ft/yr (52.4 m^3/s) (Weghorst 2001). As shown in Figure 3.2-17, annual inflow to the Salton Sea is variable. The standard deviation of the inflow is about 78,750 ac-ft/yr (3.1 m^3/s) for the period 1950 through 1999 (Weghorst 2001). Assuming an initial elevation of –227 ft (–69 m) MSL, the variation in Salton Sea inflow would produce a change of depth of about 6 in. (15 cm) (about 1.7% of the Sea's average depth), with a surface area change of about 1,100 acres (445 ha) (about 0.5% of the existing surface area) (Weghorst 2001). About 6% of the inflow to the Salton Sea is natural flow; the rest of the inflow is return flow from irrigation and municipal wastewater (Setmire 2000). Most of the agricultural water used in the watershed is derived from the Colorado River. About two-thirds of the water used for agriculture is consumed or lost to evaporation; about one-third of the water applied to fields eventually reaches the Salton Sea (Cohen et al. 1999). The residence time of agricultural water in the soil is about 6 years (BOR 2001). Colorado River water is delivered to the Coachella

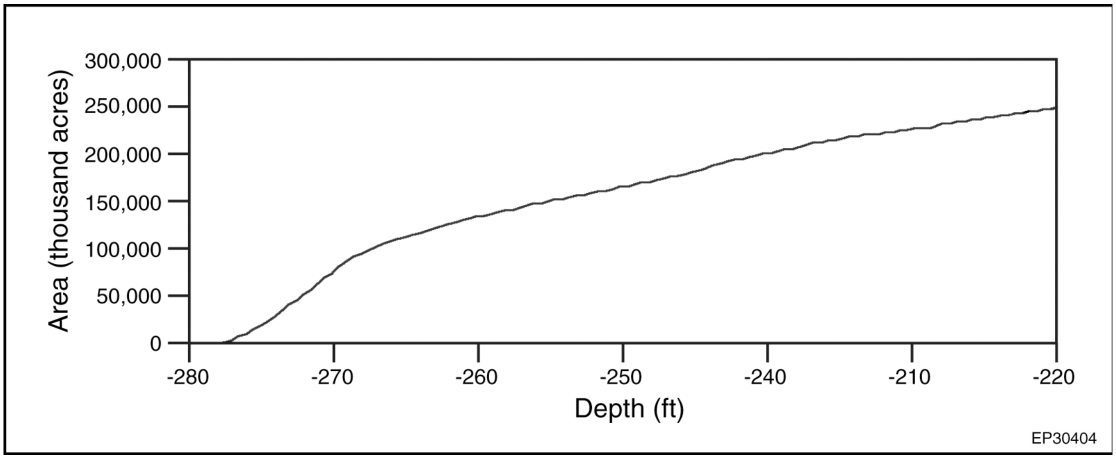

FIGURE 3.2-15 Depth/Area Relationship for the Salton Sea (Source: Weghorst 2001)

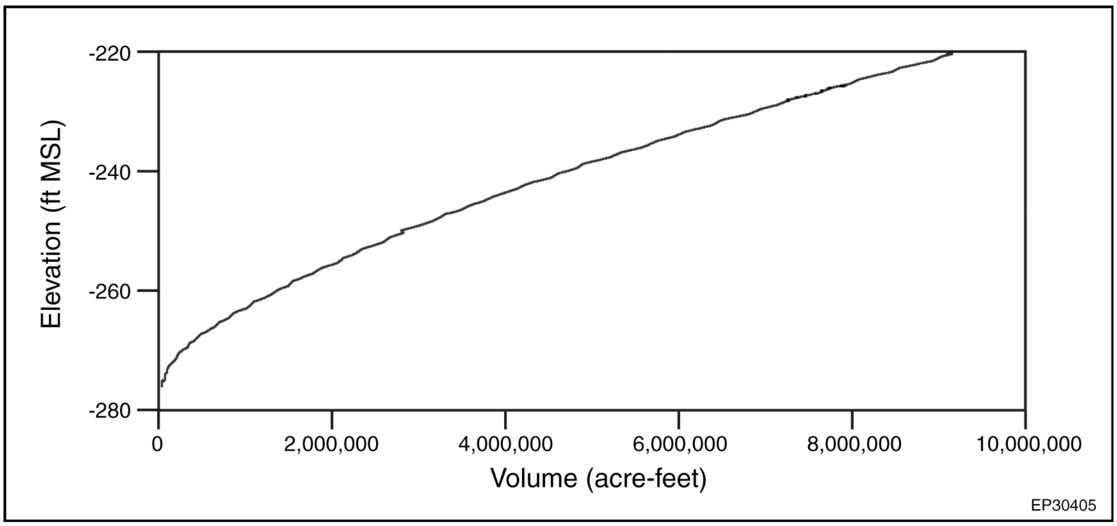

FIGURE 3.2-16 Volume/Depth Relationship for the Salton Sea (Source: Weghorst 2001)

and Imperial Valleys via the All American and Coachella Canals. Inflow from the New River south of the U.S.-Mexico border accounts for about 14% of the total inflow to the Salton Sea, while the flow at Westmorland accounts for about 36% of the Sea's total inflow.

Because the Salton Sea is situated in a closed basin, water flows into it but does not leave, except by evaporation. The evaporation rate is about 6 ft/yr (2 m/yr) (Ponce et al. 2003). With time, evaporation reduced the elevation of the water in the Sea to its current value of approximately –227 ft (–69 m) MSL. The Salton Sea is in a near state of equilibrium, with inflow water roughly equaling the water lost to evaporation (BOR 1999).

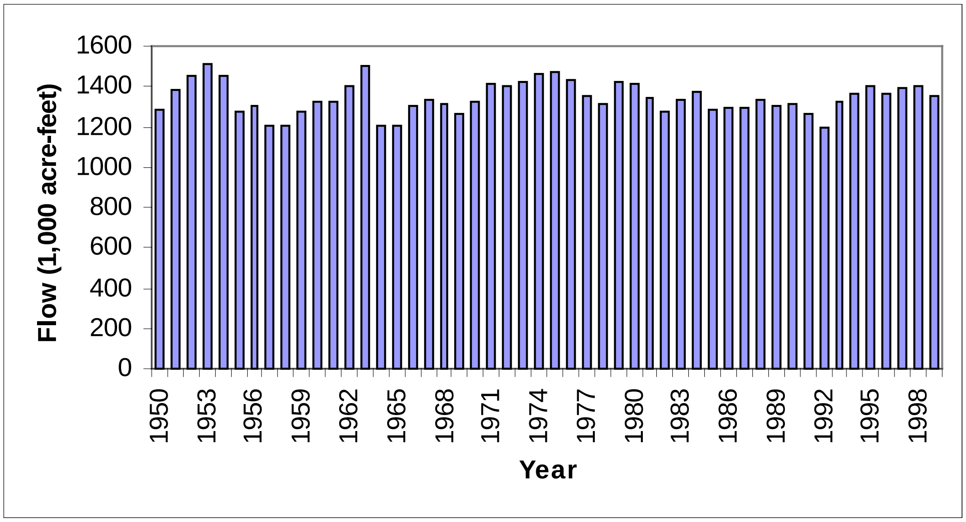

FIGURE 3.2-17 Inflow Volume to the Salton Sea (Source: Weghorst 2001)

3.2.1.3.2 Water Quality. As mentioned previously, the Colorado River Basin Regional Water Quality Control Board adopted Resolution 98006 during its January 1998 public meeting, which updated the list of impaired water bodies for the region. The updated list included the New River, the Alamo River, and the Salton Sea. Impairment of the Salton Sea was associated with salt, selenium, and nutrients (SWRCB 2003; CRBRWQCB 2003c).

Water that flows into the Salton Sea contains dissolved salts. Figure 3.2-18 shows the total salt load into the Sea as a function of time for the period 1950 through 1999 (Weghorst 2001). The mean total load of dissolved salts entering the Salton Sea was about 4.6 million tons/yr (4.2 million t/yr). As indicated in Figure 3.2-18, the total load of salts per year varied considerably with time. The standard deviation of the annual salt load is about 640,000 tons (580,598 t). Figure 3.2-19 shows the TDS load entering the Salton Sea for the same period of record (TDS was calculated by dividing the total salt load by the annual volume of inflow water). The mean TDS for the inflow water was about 2,525 mg/L; the standard deviation of the inflow TDS was about 340 mg/L. Because the Sea is in a closed basin, incoming water evaporates, leaving behind the dissolved salts, thereby increasing the salinity of the Sea. Not all salts in the incoming water to the Salton Sea increase its salinity; some of the salts (particularly calcium salts as carbonate and sulfate, i.e., calcite and gypsum, respectively) precipitate (BOR 2001). Weghorst (2001) estimated that about one-third of the annual salt discharged to the Sea would precipitate. Other estimates range from 0.77 million to 1.32 million tons (0.7 million to 1.2 million t) of salt precipitated annually (BOR 2001).

In 1907, shortly after the Salton Sea was formed, its salinity was about 3,500 mg/L. Currently, it is about 44,000 mg/L (BOR 2003a) (Figure 3.2-20), approximately 25% saltier than ocean water. In 1998, the Colorado River Basin Regional Water Quality Control Board, in accordance with Section 303(d) of the CWA, listed the Salton Sea as impaired in its Water Quality Assessment because the salinity of the Sea exceeded the Regional Board's water quality

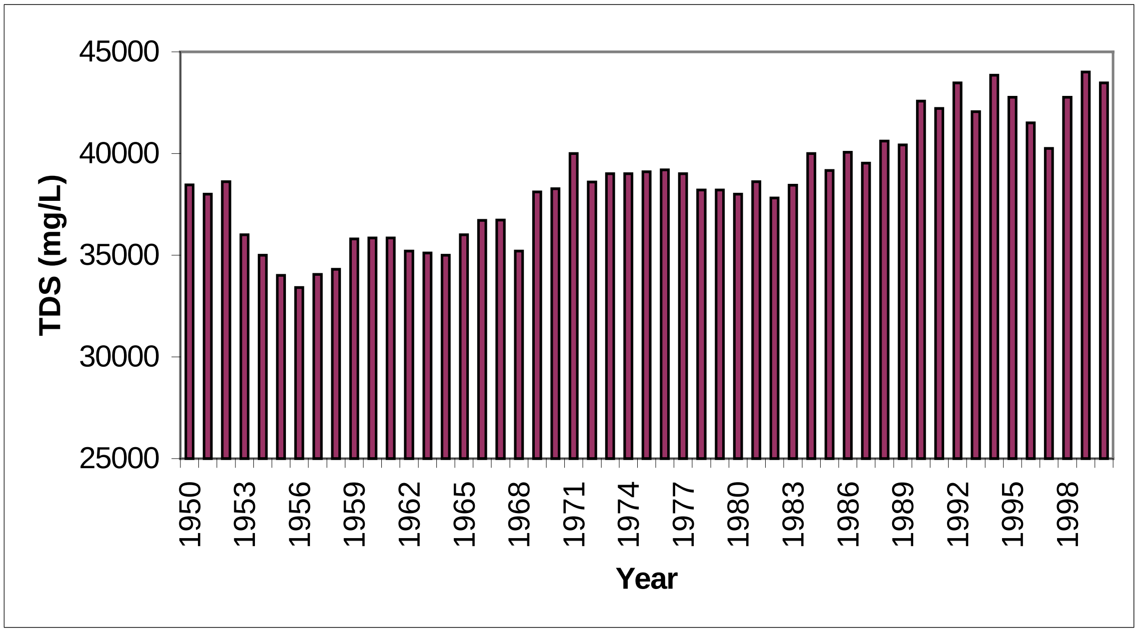

FIGURE 3.2-20 Salton Sea Total Dissolved Solids (Source: Weghorst 2001)

objective of reducing the salinity level to 35,000 mg/L, "unless it can be demonstrated that a different level of salinity is optimal for the sustenance of the Sea's wild and aquatic life" (CRBRWQCB 1991). The actual salinity of the Sea is uncertain because of measurement precision (on the order of 1% for conductance measurements), the location of the measurement (there is an approximate difference of 3% between the center of the north and south sub-basins of the Sea), a difference of about 1% between measurements taken at the Sea surface and measurements taken near its bottom, density variations in the Sea's water (a range of 1.028 to 1.032 g/cm^3), and temperature (BOR 2001). The uncertainty of the Sea's salinity is estimated to be about 5% of its actual value, or about 2,200 mg/L (BOR 2001).

The rate of increase of salinity in the Salton Sea has had a wide range of values reported in the literature. Between 1980 and 1995, the rate was approximately 430 mg/L/yr. At this rate, the Salton Sea would reach a value of 60,000 mg/L within about 37 years from its current salinity level. Because of toxicity, salinity values in excess of 60,000 mg/L would kill fish populations in the Sea (BOR 2003a). The rate of salinity increase for the Sea is highly uncertain. Estimates range from 0.4 to 1% per year (about 175 to 440 mg/L/yr) (BOR 1998a). For these rates of increasing salinity, the Salton Sea would reach a salinity of 60,000 mg/L after about 90 and 36 years, respectively.

Selenium. Although the potential loss of fish and other organisms that depend on the Salton Sea is closely related to salinity issues and high concentrations of nutrients, there are also significant water quality concerns related to selenium (CRBRWQCB 1991). Selenium is derived from irrigation water passing through clayey soils. The selenium concentration in Salton Sea water is very low, about 0.001 mg/L. This concentration is much less than the 0.05 mg/L MCL for selenium in drinking water (EPA 1996); however, concentrations in the Sea's sediment and biota are at levels of concern (Salton Sea Authority 1997). Most of the selenium in sediment occurs at the north end of the Sea (Redlands Institute 2002). The dissolved selenium in the Sea can be taken up and concentrated in tissues of small organisms in the Sea. Selenium can be further concentrated (biomagnified) by larger organisms from eating the smaller ones (CRBRWQCB 1991). At greatest risk are the larger fish-eating (piscivorous) birds, such as the double-crested cormorant, great blue heron, and the cattle egret, which have fairly long food chains. Other birds, such as the black-necked stilt, American coot, eared grebe, northern shoveler, and the ruddy duck also have elevated selenium concentrations in tissues, livers, and/or eggs. Concentrations in these birds, however, are lower because of shorter food chains (BOR 1998b).

Phosphorus. In addition to salinity and selenium, the Salton Sea is highly eutrophic (i.e., its waters are rich in dissolved nutrients, photosynthetically productive, and often deficient in oxygen during warm weather). Eutrophication of the Salton Sea is caused by the inflow of agricultural drainage and municipal effluent containing high levels of nutrients, especially nitrogen and phosphorus (EPA 2003c). High nutrient levels in the Sea promote algal blooms. Algal respiration and the decomposition of dead algae consume large quantities of oxygen, decrease concentrations of DO in the Sea, and kill fish by suffocation due to a lack of oxygen (Pacific Institute 2001). Fish kills then release algal nutrients back to the Sea, thus promoting additional algae growth.

Recent studies indicate that the ratio of nitrogen to phosphorus in the Sea exceeds 25. Because there is much more nitrogen than phosphorus in the Sea, phosphorus is the limiting nutrient for eutrophication. In 1999, the average mass of phosphorus in the Salton Sea was about 1,389 lb (630,000 kg) (Setmire 2000), with phosphorus loading coming primarily from external sources (New River, Alamo River, White Water River, and agricultural drains). Most of the nutrient load is supplied by the rivers. In 1999, the following phosphorus loads occurred: Alamo River – 1.3 million lb (0.574 million kg); New River – 1.5 million lb (0.669 million kg); and White Water River – 120,000 lb (0.053 million kg) (Setmire 2000). The nitrogen to phosphorus ratios for surface water (epilimnion) reached 192:1; hypolimnion ratios (bottom of the Sea) were even higher (430:1).

For samples collected during 1999 from three sites in the Salton Sea, total phosphorus concentrations in water ranged from less than 0.005 to 0.222 mg/L, with a median value of 0.071 mg/L in surface waters, and a median value of 0.059 mg/L near the bottom. These values exceed the phosphorus concentration of 0.025 mg/L recommended to prevent eutrophication in lakes (University of California, Davis 2003). These values have remained about the same over the past 25 years, indicating that there are processes occurring in the Sea that control (i.e., buffer) the phosphorus concentration against variations in influx concentrations.

Because phosphorus is a limiting nutrient for eutrophication, the degree of eutrophication of the Sea could be most easily reduced by decreasing the amount of phosphorus that enters it from its tributaries. A similar-sized reduction in the quantity of nitrogen entering the system would not affect the system as much because nitrogen is so plentiful. Although reducing the phosphorus load to the Salton Sea would improve its condition, a 50 to 80% reduction in load would be required to achieve a marked decrease in eutrophication (Setmire 2000).

3.2.1.3.3 Salton Sea Water Quality Guidelines. TMDLs have been proposed for the Salton Sea in order to improve its water quality. In July 2003, the EPA gave final approval to California's 2002 Section 303(d) List of Water Quality Limited Segments, which identified the Salton Sea as an impaired watershed because of selenium, salt, and nutrients. At the present time, a TMDL is being developed for nutrients (CRBRWQCB 2004d). A TMDL program will begin for selenium in 2005, with a target completion date of 2010 (CRBRWQCB 1998b). The State of California has determined that an engineered solution for salinity will be more effective than the development of a TMDL (CRBRWQCB 2003b).

3.2.1.3.4 Salton Sea Restoration. The Salton Sea Authority was established in 1993 to direct and coordinate actions to improve water quality, stabilize water elevation, and enhance recreational and economic development of the Salton Sea and other beneficial uses (EPA 2003c). The Salton Sea Authority is composed of Riverside and Imperial Counties, the IID, and the Coachella Valley Water District. The Torres Martinez Desert Cahuilla Indians and a host of Federal and State agencies are ex officio members of the Authority (Codekas 1998).

The Salton Sea Reclamation Act of 1998 directed the Secretary of the Interior to study options for managing the salinity and elevation of the Salton Sea (EPA 2003c). The act required that certain options be analyzed and required the consideration of reduced inflows down to a level of 800,000 ac-ft (31.3 m^3/s) or less per year. In January 2000, the Salton Sea Authority and the U.S. Bureau of Reclamation (BOR) issued a draft environmental impact report (EIR)/EIS that analyzed five alternatives for restoring the Salton Sea (Salton Sea Authority and BOR 2000). The proposed restoration project was developed to comply with Federal legislation that directs the Secretary of the Interior to conduct a research project for the development of a method to reduce and control salinity, provide endangered species habitat, enhance fisheries, and protect recreational values in the area of the Salton Sea. In August 2000, the BOR and the Salton Sea Authority announced plans to revise and supplement the EIR/EIS on the basis of public comments and engineering evaluations. Under the supplemental review process, additional restoration alternatives, including the use of large-scale solar ponds, are being explored.

In April 2003, the Salton Sea Authority Board of Directors endorsed moving ahead with the "North Lake" plan to improve the Salton Sea (EPA 2003c). This plan involves creating and managing an ocean-like lake in the North Basin of the Sea by constructing a dam midway across the current Sea. Extensive shallow water habitat would be created by using stepped ponds in the South Basin of the Sea. The plan also includes desalinization of Imperial Valley rivers that flow into the Salton Sea. Desalinated water from the rivers would be sold, and the proceeds would be used to help fund improvements to the Salton Sea (Salton Sea Authority 2003b).

3.2.2 Wetlands

The BOR's Citizen Task Force has developed two pilot-project wetland areas, Imperial and Brawley, along the New River in California (Figure 3.2-21). These wetlands were designed to improve water quality and provide new wildlife habitat by reducing nutrients, pathogens, and industrial waste in the river; reduce nutrients and agricultural chemicals in the drains; and help meet the Colorado River Basin Regional Water Quality Control Board's objective to improve environmental conditions (IID 2003c). Initial construction of the wetlands began in the late spring of 2000 (Miller 2001).

The Imperial wetland site is about 1.5 mi (2.4 km) long and occupies about 68 acres (28 ha). This site receives its water from Rice Drain and is fed entirely by agricultural runoff. This wetland is designed to process about 6.9 million gal (approximately 21 ac-ft [26,000 m^3]) of water annually (Sustainable Conservation 2002). Because this wetland does not receive water from the New River, it will not be discussed further in this report.

At the 7-acre (3-ha) Brawley site, water is pumped directly from the New River to large settling ponds to settle out the heavier silts. The water then flows into a series of smaller ponds planted with native bulrushes and sedges. This wetland is designed to process approximately 2.4 million gal (approximately 7 ac-ft [8,600 m^3]) of water per year (Sustainable Conservation 2002). Passing the river water through the complex of rushes and sedges in the wetlands reduces suspended solids by as much as 97% and increases the DO content by up to 83%. Wetland-processed water leaving both sites eventually discharges to the New River (BOR 2003b).

Some concerns have been raised that the wetlands could be harmful to wildlife by increasing potential exposure to toxic constituents, such as selenium, in sediments (Sustainable Conservation 2002). Deep sediment basins have been added to the wetlands to prevent diving ducks from reaching potentially contaminated food sources on the bottom, and bypass pipelines were added to allow operators to bypass some wetland cells from operation, if needed.

If successful, the pilot wetland project will be expanded to cover most of the river bottom areas of the New and Alamo Rivers, with about 40 new sites being considered.

3.2.3 Floodplains

No perennial streams or rivers are within the area of the proposed and alternative transmission line routes. However, three defined drainages traverse the proposed routes from, generally, southwest to northeast. The northernmost and largest in area is Pinto Wash, draining toward the northeast. Pinto Wash crosses the proposed routes about 3,000 ft (914 m) south of the IV Substation, where it is more than 3,000 ft (914 m) wide (Figure 3.2-21). Another drainage is just south of State Route 98. This area includes the confluence of two streambeds, where a culvert and dam have been placed. The area directly downstream of the culvert has been heavily disturbed due to off-road vehicle traffic. The southernmost area is an extension of an unnamed intermittent drainage that rises to the southwest in Mexico and drains northeasterly. These drainages are normally dry but are probably subject to flash-flooding in occasional torrential storms that can occur in the area. Pinto Wash is the site of the only 100-year floodplain mapped in the proposed transmission line routes by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps.

The proposed action might also affect the floodplain of the New River, because water that would normally flow into the New River would be diverted for plant operations. The 100-year floodplain of the New River has a narrow channel that meanders through a large, steep banked channel in the valley floor. The steep banked channel lies within a broader channel that was created in 1905 when the New River and Salton Sea were formed. Within the large channel are a series of agricultural fields, undeveloped open spaces, drains, access roads, and the Brawley Sewage Treatment Plant (DOT 2001).

3.2.4 Groundwater

The proposed routes for the transmission lines overlie the Imperial Valley Groundwater Basin in the southern part of the Colorado Desert Hydrologic Regime. The basin is bounded on the east by the Sand Hills and on the west by impermeable rocks of the Fish Creek and Coyote Mountains (Figure 3.1-1). Its discharge point is the Salton Sea. Major surface hydrologic features crossing over the groundwater basin are the New and Alamo Rivers, the three branches of the All-American Canal, and the Coachella Canal (California Department of Water Resources 2004a).

Two major aquifers occur in the groundwater basin. These aquifers consist predominantly of alluvial deposits of late Tertiary and Quaternary age. The upper aquifer is about 200 ft (61 m) thick, with a maximum thickness of 450 ft (138 m). It is separated from the lower aquifer by a semipermeable aquitard that averages 60 ft (18 m) thick, with a maximum thickness of 280 ft (85 m). The lower aquifer averages 380 ft (116 m) thick, with a maximum thickness of 1,500 ft (457 m). Low-permeability lake deposits create locally confined aquifer conditions. The total storage capacity of the basin is estimated to be 14,000,000 ac-ft (California Department of Water Resources 2004a).

The major source of groundwater recharge in the Imperial Valley Groundwater Basin is from irrigation return. Other recharge sources include rainfall infiltration; surface runoff, especially in the East Mesa and West Mesa where surface deposits are fairly permeable; underflow into the basin, mainly from Mexicali Valley to the south; and seepage from the New River and the All-American and Coachella Canals. Together, recharge sources contribute about 423,000 ac-ft/yr (16.5 m^3/s), including 250,000 ac-ft/yr (9.8 m^3/s) from canal seepage and 173,000 ac-ft/yr (16.8 m^3/s) from subsurface inflow, with the New River contributing about 7,000 ac-ft/yr (6.3 m^3/s). Total discharge is about 439,500 ac-ft/yr (17.2 m^3/s) (including an average loss to streams of about 169,500 ac-ft [6.6 m^3/s]) (California Department of Water Resources 2004a).

Because of its high TDS concentrations (ranging from 498 to 7,280 mg/L), a major portion of the groundwater from the Imperial Valley Groundwater Basin is considered undesirable for domestic and irrigation purposes, unless treated. Groundwater in some areas of the basin also has elevated levels of fluoride and boron (California Department of Water Resources 2004a).

3.3 CLIMATE AND AIR QUALITY

This subsection describes the climate and air quality of the Imperial County region.

3.3.1 Climate

3.3.1.1 California

The State of California has a very diverse climate range, extending over four out of the six major global climate zones. A Mediterranean climate zone exists in the coastal regions, with wet winters and dry summers, and varies greatly up and down the coast. A semiarid, or steppe, climate zone encompasses much of the San Joaquin Valley and the fringes of the Mojave Desert. There is less rainfall in this zone, and temperatures are generally warmer than in the Mediterranean zone. A microthermal, or Alpine, climate zone is found in the higher elevations of the Sierra Nevada, the Modoc Plateau, and the Klamath Mountains. This mountain climate has short, cool summers and snowy winters; average temperatures in the coldest month are below freezing. A desert climate exists in the southeastern third of the state, east of the Sierra Nevada and Peninsular ranges and in the southwestern part of the San Joaquin Valley. Cut off by mountains from westerly moisture-laden Pacific storms, this leeward rain shadow region receives very little precipitation. Summer temperatures in this region are the highest in the state and can average more than 100°F (38°C). The diversity of California's climate is illustrated by a precipitation range from about 80 in. (203 cm) in the more temperate Mediterranean north coast to less than 3 in. (8 cm) in the desert region in Imperial County. The more generally prevailing winds statewide in California are incoming westerlies[3] from the Pacific Ocean. These winds are reflective of the eastern Pacific high-pressure zone centered off the California coast that typically is the major influence on California's climate.

3.3.1.2 Regional

The desert region that includes Imperial County is classified under the modified Köppen Climate Classification System as arid, low-altitude desert (hot). Imperial County is in one of the hottest and driest parts of California, characterized by hot, dry summers and relatively mild winters. During the summer, the Pacific high-pressure zone is well-developed to the west of California, and a thermal trough overlies California's southeast desert region. The intensity and

[3] Wind direction is conventionally described as the direction *from* which a wind blows. Thus "westerlies" are winds that come from the west. Throughout the discussions in this EIS, a wind direction describes the direction from which a wind is blowing.

orientation of the trough varies from day to day. Although the rugged mountainous country surrounding the Imperial Valley inhibits circulation, the influence of the trough does permit some interbasin exchange of air with more westerly coastal locations through the mountain passes.

Relative humidity in the summer is very low, averaging 30 to 50% in the early morning and 10 to 20% in the afternoon. During the hottest part of the day, a relative humidity below 10% is common, although the effect of extensive agricultural operations in the Imperial Valley tends to raise the humidity locally. The prevailing weather conditions promote intense heating during the day in summer, with marked cooling at night.

As Table 3.3-1 and Figure 3.3-1 show, the normal maximum temperature in January in the Imperial County region is about 70°F (21°C), and the normal minimum temperature is around 41°F (5°C). In July, the normal maximum temperature is more than 107°F (42°C), while the normal minimum temperature is about 75°F (24°C). Average annual precipitation is less than 3 in. (7 cm).

Figure 3.3-2 is a wind rose plot that illustrates the annual distribution of hourly wind direction and speed measurements made over a 10-year period from 1993 through 2002 at the Imperial U.S. Weather Service weather station (identification number 747185) located at Imperial County Airport, south of Imperial, and at an elevation of –56 ft (–17 m). This site is located approximately 10 mi (16 km) northeast of the IV Substation and is fairly central to Imperial County. As Figure 3.3-2 shows, the annual winds are somewhat dichotomous in nature, mainly either westerly or east/southeasterly. However, they are predominately westerly, which is reflective of the statewide prevailing incoming westerlies referred to in Section 3.3.1.

Figures 3.3-3, 3.3-4, and 3.3-5 are wind rose plots showing the seasonal distribution of hourly wind direction and speed measurements over the same 10-year period for the fall months of September, October, and November; the winter months of December, January, and February; and the spring months of March, April, and May. As the figures show, the wind rose distributions for these seasons are consistent and very similar to the annual distribution.

TABLE 3.3-1 Average Temperatures and Precipitation in Imperial County[a]

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high temperature (°F)	70.2	74.5	79.3	86.1	94.0	103.4	107.0	105.7	101.1	90.9	78.1	69.7	88.3
Average low temperature (°F)	41.3	44.9	48.7	53.5	60.6	68.4	75.8	76.6	70.6	59.2	47.3	40.5	57.3
Precipitation (in.)	0.51	0.36	0.31	0.05	0.03	0.01	0.06	0.32	0.36	0.35	0.17	0.43	2.96

[a] Average readings from 1971 to 2000 at the El Centro 2 SSW Weather Station of the U.S. Weather Service, in Imperial County at latitude 32°46′N, longitude 115°34′W, at an elevation of -30 ft (-9 m). The site is approximately 5 mi (8 km) south of the Imperial U.S. Weather Service Station.

Figure 3.3-6 shows the distribution of hourly wind direction and speed measurements for the summer months of June, July, and August. The figure also shows a dramatic reversal to a predominately east-southeasterly wind pattern, with a strong westerly component remaining.

Figures 3.3-7, 3.3-8, 3.3-9, 3.3-10, and 3.3-11 are wind rose plots illustrating the distribution of wind direction and speed in Mexicali in Baja California, Mexico, abutting the U.S. border immediately south of Calexico, in an area some 16 mi (25 km) south of the Imperial U.S. Weather Service site, and approximately 8 to 10 mi (13 to 16 km) east of the Termoeléctrica de Mexicali (TDM) and La Rosita Power Complex (LRPC) power plants. These wind rose figures are based on records of meteorological observations taken in Mexicali through 1997 and 1999 at four monitoring sites at El Centro de Bachillerato Tecnológico Industrial y de Servicios (CBTIS), Colegio de Bachilleres (COBACH), Instituto Tecnológico de Mexicali (ITM), and Universidad Autonomos de Baja California (UABC) in Mexicali. Their locations are shown in Figure 3.3-13.

Measurements commenced as early as January 1, 1997, at ITM and as late as June 1, 1999, at COBACH, and ceased at all four sites on December 31, 1999. There were other measurement gaps. The four-site data set encompasses the entire period; however, contemporaneous data at all four sites were not always collected (about 10% of possible measurements were not recorded). Of the data collected, DOE and BLM determined that 5% of the data were flawed and were not suitable for use in this EIS analysis.

Measurements for all four sites in Mexicali over the 3-year 1997 through 1999 period were pooled into a combined “12 site-year” set of data allowing regionally representative wind roses to be constructed. Figure 3.3-7 shows a site-averaged average annual wind rose of speed and direction. Again, as was the case for the Imperial U.S. Weather Service site, a clear dichotomy in annual prevailing wind directions is shown; northwesterly winds from the United States to Mexico and southeast winds from Mexico to the United States. It is apparent that the northwesterly winds from the United States to Mexico are dominant.

Figures 3.3-8, 3.3-9, and 3.3-10 are site-averaged wind rose plots for the fall months of September, October, and November; the winter months of December, January, and February; and the spring months of March, April, and May. The wind rose distributions for these seasons are very similar, and it is apparent that northwesterly winds from the United States to Mexico are overwhelmingly dominant. Figure 3.3-11 shows a wind rose for the summer months of June, July, and August. This wind rose illustrates a dramatic reversal in the summer to predominately southeasterly winds from Mexico to the United States, with a small northwest component remaining.

Surface winds in the Mexicali area appear to veer (move clockwise) relative to those in the Imperial area to the north. However, the Mexicali wind patterns broadly echo the wind patterns of the Imperial area. In summary, for most of the year, surface winds from the west or northwest strongly dominate (i.e., winds generally blow from the United States to Mexico) in the border region of Imperial County; for three months in the summer, however, southeasterly winds dominate (i.e., winds generally blow from Mexico into the United States).

3.3.2 Air Quality

The Clean Air Act (CAA) established the principal framework for national, State, and local efforts to protect air quality in the United States (42 USC §§ 7401–7642). Under the CAA, the EPA has set standards known as National Ambient Air Quality Standards (NAAQS) for six pollutants considered to be key indicators of air quality, namely, CO, NO_2, O_3, sulfur dioxide (SO_2), lead (Pb), and two categories of particulate matter (PM_{10} and $PM_{2.5}$). National primary ambient air quality standards define levels of air quality, with an adequate margin of safety that sets limits to protect the public health, including the health of sensitive populations such as asthmatics, children, and the elderly. National secondary ambient air quality standards define levels of air quality judged necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA is also responsible for ensuring that these air quality standards are met or attained in cooperation with State, Tribal, and local governments through national strategies to control pollutant emissions from automobiles, factories, and other sources. As delegated by the EPA, the State of California is responsible for protecting California's air quality. The California Environmental Protection Agency (Cal/EPA) was created in 1991 by a Governor's Executive Order. Six Boards under this "umbrella" are responsible for the protection of human health and the environment and the coordinated deployment of state resources. The California Air Resources Board (ARB) is responsible for interpreting and implementing those statutes pertaining to the control of air pollution. The ARB regulations are contained in Titles 13 (Motor Vehicles) and 17 (Public Health) of the *California Code of Regulations*. The ARB gathers air quality data for the State of California, ensures the quality of these data, designs and implements air models, sets ambient air quality standards for the state, compiles the state's emissions inventory, and performs air quality and emissions inventory special studies. The ARB is responsible for monitoring the regulatory activity of California's 35 local air districts, which are responsible for promulgating rules and regulations for stationary sources. California is divided geographically into 15 air basins for the purpose of managing the air resources of the state on a regional basis, and each air basin generally has similar meteorological and geographic conditions throughout. The Salton Sea Air Basin encompasses all of Imperial County plus the major western portion of Riverside County to the north. The 6 mi (10 km) of double-circuit, 230-kV transmission lines extending south from the IV Substation to the U.S.-Mexico border north of Mexicali, Mexico, that are associated with the proposed action of these projects undertaken in the United States are in the ICAPD and lie within the Salton Sea Air Basin.

Table 3.3-2 gives the State and Federal ambient air quality standards. California has set additional ambient standards for visibility-reducing particulates, sulfates, hydrogen sulfide, and vinyl chloride, and they are also listed in this table.

Areas that meet the NAAQS are said to be in "attainment." The air quality in attainment areas is managed under the Prevention of Significant Deterioration Program of the CAA. The

New O_3 and $PM_{2.5}$ Standards

On July 18, 1997, the EPA introduced new ambient air quality standards for ground-level O_3 and for particulate matter (62 FR 38855 and 62 FR 38562). The EPA planned to phase out and replace the 1-hour 0.12-ppm O_3 standard with a new 8-hour 0.08-ppm standard more protective of public health. The EPA also adopted two new standards for $PM_{2.5}$. These were set at 15 $\mu g/m^3$ annual arithmetic mean $PM_{2.5}$ concentrations and 65 $\mu g/m^3$ 24-hour average. The standard for PM_{10} was essentially unchanged.

In response to legal challenges, however, the U.S. Court of Appeals for the District of Columbia vacated the new particulate standard and directed the EPA to develop a new standard, meanwhile reverting back to maintaining the previous PM_{10} standards. The revised O_3 standard was not nullified, but the court ruled that the standard "cannot be enforced."

In July 2000, the EPA formally rescinded the 8-hour 0.08-ppm O_3 standard and reinstated the 1-hour 0.12-ppm O_3 standard in the approximately 3,000 counties where it had been replaced. In February 2001, the U.S. Supreme Court affirmed the EPA's authority to establish health-related air quality standards and affirmed that the CAA prohibits consideration of implementation costs when setting those standards. The Supreme Court, however, overturned the EPA's procedures for implementing the standards and remanded the case back to the Appeals Court level for resolution of those and certain other issues. On March 26, 2002, the Appeals Court found the new air standards that had been subject to challenge to be neither arbitrary nor capricious and denied petitions for review except to the extent that their earlier decisions and those of the Supreme Court require action by the EPA.

On June 2, 2003, the EPA stated in a Proposed Rule (68 FR 32801) on the implementation of the 8-hour O_3 NAAQS that it intended to issue final attainment and nonattainment area designations for $PM_{2.5}$ by December 2004 and for 8-hour O_3 by April 2004.

On April 15, 2004, a Final Rule designating and classifying areas not meeting the NAAQS for 8-hour O_3 was signed by the Administrator of the EPA. This Final Rule was published in the *Federal Register* on April 30, 2004 (69 FR 23951), and a revision to the preamble was published on June 25, 2004 (69 FR 35526). The EPA designated and classified areas under the 8-hour O_3 standard, and in a separate action finalized the first phase of the rule implementing the 8-hour O_3 standard. Designations and classifications are to take effect on June 15, 2004. The EPA will revoke the 1-hour O_3 standard 1 year after the effective date of designating attainment and nonattainment areas for the 8-hour standard. Deadlines for attainment in designated nonattainment areas extend from 2007 to 2021, depending on the severity of nonattainment. Imperial County is designated as marginal nonattainment for the 8-hour O_3 standard, and attainment is to be achieved in 3 years time.

By December 31, 2004, the EPA will finalize designations for the $PM_{2.5}$ standards based on earlier recommendations in February 2004 from States and Tribes. Currently (as of April 2004), the 1-hour 0.12-ppm O_3 standard, the 150-$\mu g/m^3$ 24-hour PM_{10} standard, and the 50-$\mu g/m^3$ annual PM_{10} standard are the O_3 or particulate matter NAAQS that are enforced.

TABLE 3.3-2 Ambient Air Quality Standards

		California Standards[a]	Federal Standards (NAAQS)[c]	
Pollutant	Averaging Time	Concentration[b]	Primary[b,d]	Secondary[b,e]
Ozone (O_3)	1-hour 8-hour	0.09 ppm (180 μg/m^3) –[f]	0.12 ppm (235 μg/m^3) 0.08 ppm (157 μg/m^3)[g]	Same as primary standard
Respirable particulate matter (PM_{10})	24-hour Annual arithmetic mean	50 μg/m^3 20 μg/m^3	150 μg/m^3 50 μg/m^3	Same as primary standard
Fine particulate matter ($PM_{2.5}$)	24-hour Annual arithmetic mean	No separate state standard 12 μg/m^3	65 μg/m^3 [g] 15 μg/m^3 [g]	Same as primary standard
Carbon monoxide (CO)	8-hour 1-hour 8-hour (Lake Tahoe)	9.0 ppm (10 mg/m^3) 20 ppm (23 mg/m^3) 6 ppm (7 mg/m^3)	9.0 ppm (10 mg/m^3) 35 ppm (40 mg/m^3) –	None –
Nitrogen dioxide (NO_2)	Annual arithmetic mean 1-hour	– 0.25 ppm (470 μg/m^3)	0.053 ppm (100 μg/m^3) –	Same as primary standard –
Sulfur dioxide (SO_2)	Annual arithmetic mean 24-hour 3-hour 1-hour	– 0.04 ppm (105 μg/m^3) – 0.25 ppm (655 μg/m^3)	0.030 ppm (80 μg/m^3) 0.14 ppm (365 μg/m^3) – –	None 0.5 ppm (1,300 μg/m^3) –
Lead (Pb)[h]	30-day average Calendar quarter	1.5 μg/m^3 –	– 1.5 μg/m^3	– Same as primary standard
Visibility-reducing particles	8-hour	Extinction coefficient of 0.23/km; visibility of 10 mi or more (0.07–30 mi or more for Lake Tahoe) due to particles when relative humidity is less than 70%	–	–
Sulfates	24-hour	25 μg/m^3	–	–
Hydrogen sulfide	1-hour	0.03 ppm (42 μg/m^3)	–	–
Vinyl chloride[h]	24-hour	0.01 ppm (26 μg/m^3)	–	–

TABLE 3.3-2 (Cont.)

[a] California standards for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the *California Code of Regulations*.

[b] Concentration expressed first in units in which it was promulgated. For gaseous air pollutants, "ppm" refers to parts per million by volume, or micromoles per mole of gas. Since one mole of all gases at the same temperature and pressure occupies the same volume, a ppm value is unaffected by changes in temperature and pressure. Equivalent mass concentration units for air pollutant gases (shown in parentheses) are based on a reference temperature of (77°F) 25°C and a reference pressure of 760 torr.

[c] National standards (other than O_3, PM, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. (The $PM_{2.5}$ Federal standard is not yet enforced as outlined in the text.) The 8-hour O_3 standard became effective on April 15, 2004. NAAQS are listed in 40 CFR Part 50.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] A dash indicates either no California or no Federal ambient air quality standard exists.

[g] The $PM_{2.5}$ Federal standard is not yet enforced. The 8-hour O_3 standard was issued by the EPA on April 15, 2004.

[h] The ARB has identified lead and vinyl chloride as "toxic air contaminants," with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

goal of this program is to maintain a level of air quality that continues to meet the standards. Areas that do not meet one or more of the standards are designated as "nonattainment" areas for criteria pollutant(s). For regulatory purposes, remote or sparsely populated areas that have not been monitored for air quality are listed as "unclassified" and are considered to be in attainment. The CAA requires each state to produce and regularly update a State Implementation Plan (SIP) that includes a description of control strategies or measures to deal with pollution, for areas that fail to achieve NAAQS. A SIP is a plan developed at the state level that explains how the state will comply with air quality standards; a SIP is enforceable by the EPA.

The project area lies within the Salton Sea Air Basin. At present, the Salton Sea Air Basin is designated by the state as an O_3 nonattainment area and is Federally designated by the EPA as a Section 185A O_3 nonattainment area. (In this case, "Section 185A" was previously termed "transitional.") The Section 185A transitional status means that the EPA believes the nonattainment status is due partly to transboundary migration of pollutants from Mexico, the extent of which is not accurately defined. ARB (1993) has reported evidence of such transboundary migration in the influence of Mexicali sources on NAAQS exceedances in the Imperial Valley.

Out of the entire Salton Sea Air Basin, only the City of Calexico near the border crossing is classified by the State of California as a state nonattainment area for CO. This localized nonattainment area does not extend west of the Westside Main Canal and is likely the result of the high level of vehicle traffic crossing the border near this location.

Imperial County is classified by the State as a nonattainment area for $PM_{2.5}$ and has been recently[4] Federally classified by the EPA as a serious nonattainment area for PM_{10}. Particulate matter levels in Imperial County come from local and agricultural sources; the EPA does not consider a significant fraction to be transported from nearby Mexico. These sources include a combination of windblown dust from natural and disturbed land areas, with the primary source being vehicles, including off-road vehicles, that use paved and unpaved roads. Construction and agriculture also contribute to particulate levels.

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4 Prior to September 2004, Imperial County was classified as a moderate nonattainment area for PM_{10}. On October 19, 2001, the EPA issued a final rule stating that but for the negative effects of transborder emissions from Mexico, Imperial County would have timely attained the PM_{10} NAAQS (66 FR 53106). However, on October 9, 2003, the U.S. Court of Appeals for the Ninth Circuit vacated this EPA rule following petition from the Sierra Club to that court. The court held that the EPA's "but for" conclusion ran counter to the evidence before it, and remanded with instructions that the EPA reclassify the county from moderate to a serious nonattainment area (*Sierra Club v. United States Environmental Protection Agency, et al.*, 352 F.3d 1186).

On December 18, 2003, the Ninth Circuit Court denied a petition for rehearing by the Imperial County Air Pollution Control District, an intervener in the case; slightly revised its October 9, 2003, opinion; and granted the District's motion to stay the mandate until March 17, 2004, to permit the District to file a petition for a writ of certiorari in the U.S. Supreme Court. Imperial County did so on March 17, 2004. On June 21, 2004, the Supreme Court declined to hear the case (*Imperial County Air Pollution Control District v. Sierra Club, et al.*, 72 U.S.L.W. 3757). Thereafter the stay was lifted and the mandate resumed.

Thus prompted by the Ninth Circuit Court Order, the EPA published a final rule on August 11, 2004, to reclassify the Imperial Valley from a moderate to a serious PM_{10} nonattainment area (69 FR 48792). This rule became effective on September 10, 2004. The EPA's summary of this final rule is:

> EPA is taking final action under the Clean Air Act (CAA) to find that the Imperial Valley Planning Area (Imperial Valley), a moderate nonattainment area for particulate matter of 10 microns or less (PM-10), failed to attain the National Ambient Air Quality Standards (NAAQS) by the statutory deadline of December 31, 1994, and to reclassify the area as a serious PM-10 nonattainment area. Today's action is in response to a recent decision by the U.S. Court of Appeals for the Ninth Circuit that vacated EPA's earlier approval of Imperial County's demonstration that the Imperial Valley would have attained the NAAQS by December 31, 1994, but for emissions emanating from outside the United States, i.e., Mexico. EPA's approval had the effect of allowing Imperial Valley to remain a moderate nonattainment area. In vacating that approval, the Court specifically directed EPA to reclassify Imperial Valley as a serious PM-10 nonattainment area.

The EPA simultaneously signed a proposed rule on August 11, 2004, to find under the CAA that the Imperial Valley Planning Area failed to attain the NAAQS for PM_{10} for a serious nonattainment area by the statutory deadline of December 31, 2001 (69 FR 48835).

Ambient air quality data nearest the proposed transmission line routes and the two alternative routes are collected at air quality monitoring stations in El Centro and Calexico operated by the ICAPCD. The El Centro monitoring station is at 150 9th Street, about 10 mi (16 km) northeast of the IV Substation; the station in Calexico nearest the project area is at 900 Grant Street, about 12 mi (19 km) east of the proposed transmission lines border crossing.

Ambient air quality data are also collected in Imperial County at monitoring sites that are farther from the area of the projects. These are Brawley Main Street, Westmorland West 1st Street, and Niland English Road, approximately 19, 20, and 40 mi (31, 32, and 64 km) northeast from the area of the projects, respectively. Within the Salton Sea Air Basin as a whole, two additional monitoring sites are located in Riverside County at Indo Jackson Street and the Palm Springs Fire Station, approximately 60 and 80 mi (97 and 129 km) northwest from the area of the projects, respectively. These data are not reported here because the sites are less representative of the area of the projects due to their distance from the proposed transmission lines.

The Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT [the Mexico Environmental Agency]) also collects ambient air quality data at 10 monitoring sites in Mexicali immediately south of Calexico across the U.S.-Mexico border. These sites are also designated as ARB sites. They are loosely clustered within an approximate radius of several miles and generally lie approximately 11 mi (18 km) east of the southern end of the proposed transmission lines and approximately 8 mi (13 km) east of the Sempra and Intergen power plants that would supply power to the transmission lines in the area of the projects. Figures 3.3-12 and 3.3-13 show the locations of monitoring sites that are located in the United States and Mexico border regions, respectively, including those described here.

Tables D-1 through D-8 in Appendix D show a cross section of annual data of criteria air pollutant measurements in time frames ranging from 1988 to 2001 at monitoring sites in El Centro and Calexico in Imperial County and the four monitoring sites in Mexicali described previously. Measurements in the United States were made on behalf of the ARB and in Mexico on behalf of SEMARNAT. These tables were abstracted from a larger summary database of border air quality data maintained by the EPA, Technology Transfer Network, U.S.-Mexico border Information Center on Air Pollution (CICA: Centro de Información sobre Contaminación de Aire) (U.S.-México Information Center on Air Pollution) (EPA 2003d).[5]

These tables (D-1 through D-8) show the annual means of 1-hour measurements of CO, NO_2, O_3, and SO_2 recorded in each year at each site. Also shown are annual means of 24-hour measurements of PM_{10}. Measurements of criteria pollutants were not made in every year at all of the sites listed or are not yet available in summary form in the CICA database. Annual arithmetic

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5 This database was prepared by CICA from data retrieved from the EPA Aerometric Information Retrieval System (AIRS) on January 1, 2002. The EPA has since changed the AIRS to a database that is solely related to tracking the compliance of stationary sources of air pollution with EPA regulations. The Air Facility Subsystem (AIRS/AFS) information is available at http://www.epa.gov/Compliance/planning/data/air/aboutafs.html.

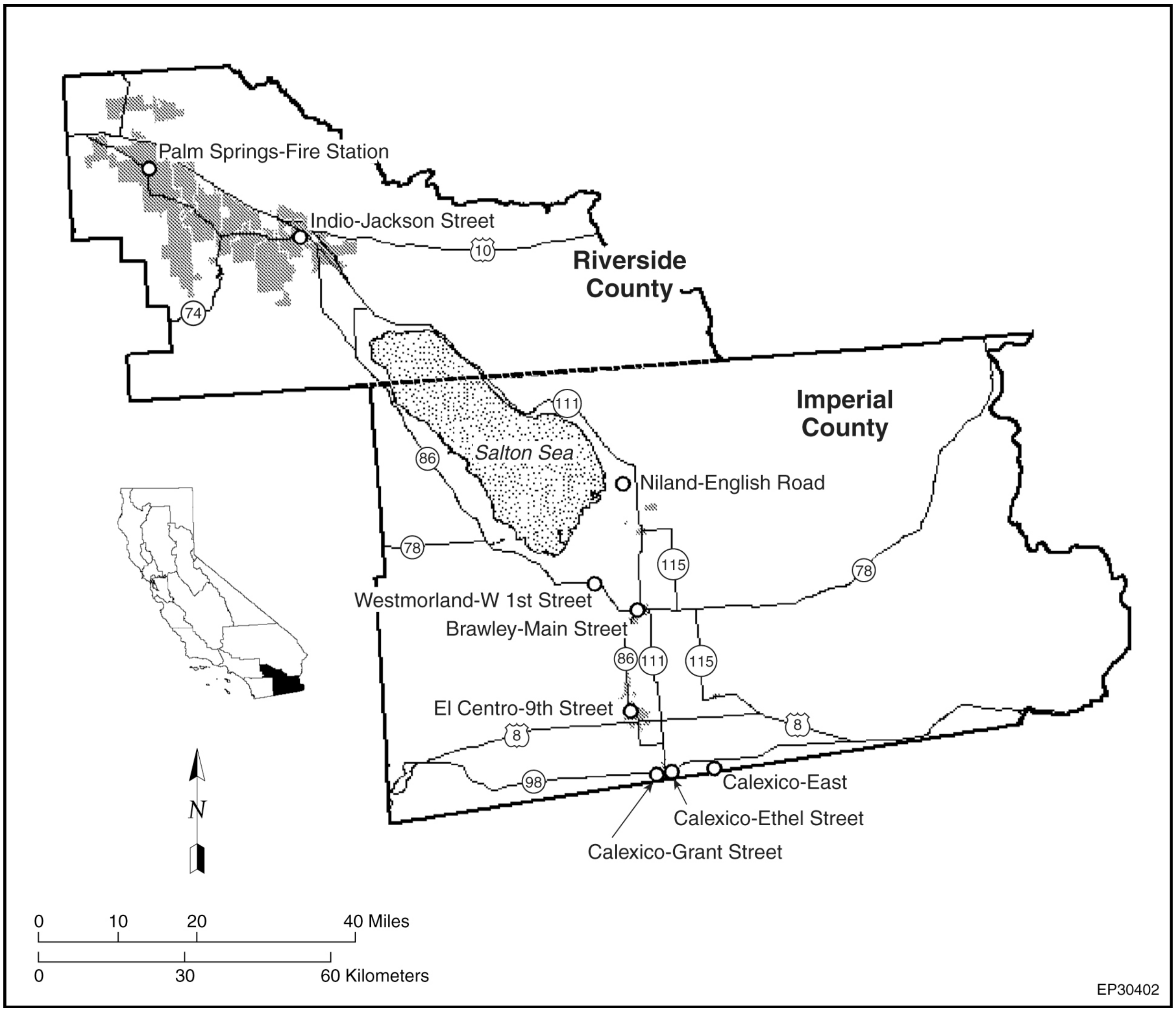

FIGURE 3.3-12 Salton Sea Air Basin Monitoring Stations ARB Map (Source: ARB 2003a)

means, annual geometric means, highest annual values, and the number of observations for each air pollutant made in any year are listed.

Appendix D can be consulted for detailed information. Figures 3.3-14 through 3.3-23 plot arithmetic mean data for criteria pollutants CO, NO_2, O_3, SO_2, and PM_{10}.

Figures 3.3-14 through 3.3-18 show that the annual mean of criteria pollutants in the border region has remained fairly constant from 1992 through 2001. The only pronounced exception is a recent peaking of PM_{10} levels in 2000 through 2001 at the Calexico East border crossing, possibly due to increased traffic activity. Figures 3.3-19 through 3.3-23 display the same data as Figures 3.3-14 through 3.3-18, but by monitoring station. As these figures indicate, the annual means of O_3, SO_2, and PM_{10} remain much the same across the border region. However, there also appears to be a regional gradient of annual means of CO (Figure 3.3-19) and

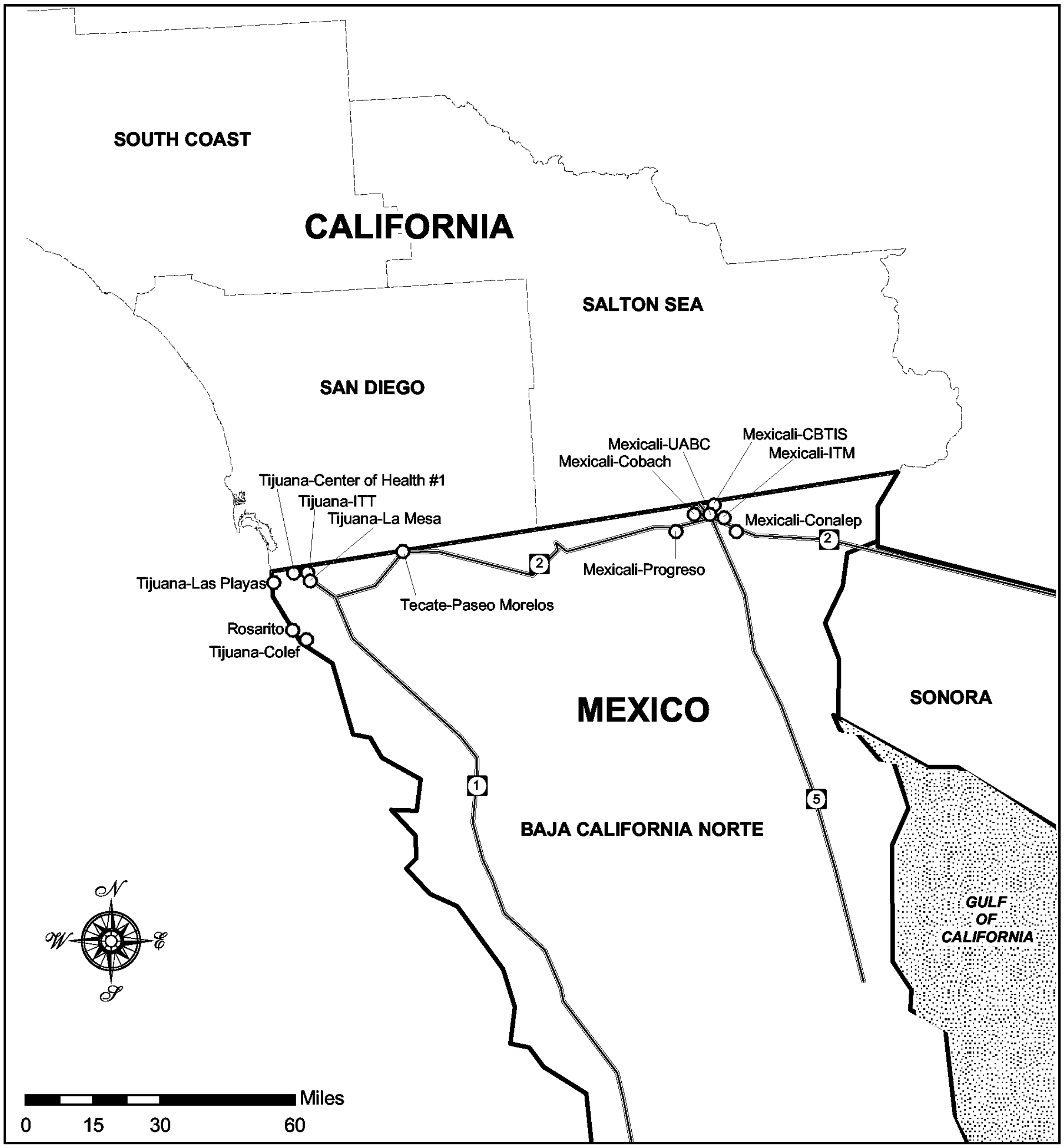

FIGURE 3.3-13 Mexico Monitoring Stations ARB Map (Source: ARB 2003a)

NO_2 (Figure 3.3-20); the highest levels are in Mexicali. This gradient may be associated with the large amount of vehicular activity in Mexicali compared with the more rural Imperial County to the north. The annual means of CO and NO_2 are also highly correlated regionally, as can be observed from a side-by-side comparison of Figures 3.3-19 and 3.3-20.

As described earlier, the Salton Sea Air Basin is classified as a Section 185A nonattainment area for O_3 and currently as a serious (see footnote 3) nonattainment area for PM_{10}. The City of Calexico near the border is classified by the State of California as a state nonattainment area for CO. Table 3.3-3 shows NAAQS exceedances and maximum air pollutant concentration measurements in Imperial County for O_3, CO, and PM_{10} from 1987 through 2003.

The nearest Class I area to the proposed action is the Agua Tibia Wilderness located in the Cleveland National Forest, about 85 mi (137 km) to the northwest. The next nearest Class I area is the Joshua Tree National Park, nestled in the foothills of southeastern California's Mojave Desert, about 100 mi (177 km) to the north.

Class I Areas

Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which EPA Prevention of Significant Deterioration regulations provide special protection. For each proposed major new source or major modification that may affect a Class I area, the applicant is responsible for identifying all Class I areas within 62 mi (100 km) of the proposed source and any other Class I areas potentially affected. The proposed action does not comprise a major modification, nor is it located within 62 mi (100 km) of a Class I area.

Ambient air concentration measurements of VOC or hydrocarbons are not recorded in Imperial County at the seven air quality monitoring sites operated either by ARB or the ICAPCD. In addition, no VOC measurement data were available for the Mexicali area as such. Thus, no VOC air concentration data are presented here. In Section 4.3, where the impacts of VOC in local O_3 formation data are discussed, emission inventory information for organic gases for Imperial County and hydrocarbons for Mexicali are used.

TABLE 3.3-3 Imperial County Air Quality Compared to NAAQS[a]

Compliance Measure/Year	Standard	1997	1998	1999	2000	2001	2002	2003
Ozone (concentrations in ppm)								
Maximum 1-hour concentration	.12	.160	.236	.171	.169	.167	.156	.144
Days over 1-hour standard		10	5	24	5	10	3	3
Maximum 8-hour concentration	.08	.120	.104	.110	.113	.112	.104	.097
Days over 8-hour standard		50	18	20	5	18	13	8
Carbon monoxide (concentrations in ppm)								
Maximum 8-hour concentration	9	17.8	14.4	17.9	15.5	12.3	11.6	8.8
Days over 8-hour standard		10	8	11	6	6	3	0
PM_{10} (concentrations in $\mu g/m^3$)								
Maximum 24-hour concentration	150	532	176	227	268	647	373	840
Monitored days over 24-hour standard		4	2	5	6	3	4	4
Calculated days over standard		12	12	32	38	18	21	25
Annual average	50	77.7	66.1	77.8	95.2	86.2	81.3	80.0

[a] Imperial County is not classified by the EPA as a Federal nonattainment area for CO. The City of Calexico near the border is classified by the State of California as a state nonattainment area for CO.

Source: Scheible (2004).

Ambient air concentration measurements of NH_3 are not recorded in Imperial County at the seven air quality monitoring sites operated either by ARB or the ICAPCD. In addition, no NH_3 measurement data were found for the Mexicali area. Thus, no NH_3 air concentration data are presented here. In Section 4.3, where NH_3 impacts are discussed, NH_3 emission inventory information for the San Joaquin Valley, Imperial County, and State of Baja California Mexico are described. No local NH_3 emission inventory data were found.

3.4 BIOLOGICAL RESOURCES

This section describes the biological resources within the United States that could be affected by the proposed action and alternatives. These resources include habitats and organisms that occur in the vicinity of the proposed transmission line routes and the IV Substation, aquatic and riparian habitats and organisms that occur within and immediately adjacent to the New River, and habitats and organisms at the Salton Sea.

3.4.1 Transmission Line Routes and Imperial Valley Substation

3.4.1.1 Vegetation Communities

The description of biological communities present within the vicinity of the proposed transmission lines and IV Substation is primarily based on biological surveys (Loeffler 2001) conducted in the vicinity of the routes for the proposed transmission lines in September and October of 2000. The surveys were conducted in a study area that was 2,150 ft (655 m) wide, centered on the existing IV-La Rosita transmission line, and that ran from the Mexico border to an area north and east of the IV Substation (Figure 3.4-1). A wetland delineation (Hodge 2001) was also performed for the same area.

Two distinctive vegetation communities, Sonoran creosote bush scrub and desert dry wash woodland, are present on the Federal land that would be traversed by the proposed transmission line routes and the two alternative routes, and in the vicinity of the IV Substation (Figure 3.4-1). Of the approximately 1,464 acres (592 ha) encompassed in the survey corridor, about 1,218 acres (493 ha) (83%) are Sonoran creosote bush scrub and about 204 acres (87 ha) (14%) are desert dry wash woodland. The remaining 42 acres (17 ha) (3%) are either covered by the State Route 98 roadway (5 acres [2 ha]) or by the IV Substation (37 acres [15 ha]). A small portion of the proposed transmission line routes is covered by a network of unpaved access roads for the existing line.

Sonoran creosote bush scrub is an open, relatively sparse plant community dominated by creosote bush (*Larrea tridentata*). Burro-weed (*Ambrosia dumosa*) and two species of saltbush (*Atriplex* spp.) are also common. Tree species such as ironwood (*Olneya tesota*), velvet mesquite (*Prosopis velutina*), and catclaw acacia (*Acacia greggii*) are interspersed throughout the community, especially in the southern half of the proposed routes in the United States.

The desert dry wash woodland plant community occurs in three areas of the proposed transmission line routes (Figure 3.4.1). The largest of these areas is Pinto Wash, located a short distance south of the IV Substation. The dominant species in this area is smoke tree (*Psorothamnus spinosus*). Other species include velvet mesquite, catclaw acacia, encilia (*Encilia frutescens*), sand verbena (*Abronia villosa* var. *villosa*), and big galleta (*Pleuraphis rigida*). A smaller area of the desert dry wash woodland occurs just south of State Route 98, where two ephemeral streambeds converge and where a dam and culvert have been constructed. Small species, such as sand verbena, chinchweed (*Pectis papposa*), paper flower (*Psilotrophe cooperi*) and white dalea (*Psorothamnus emoryi*), are present in this area. The third area supporting a desert wash community occurs in the southernmost portion of the proposed routes. This small area has become established in an ephemeral streambed and contains a stand of tamarisk (an introduced invasive shrub also known as saltcedar; *Tamarix* spp.) amid a few native shrubs and a single ironwood tree.

3.4.1.2 Terrestrial Wildlife

The Sonoran creosote bush scrub and desert dry wash woodland provide cover, foraging, and breeding habitat for a variety of native desert wildlife species. Both the desert iguana (*Dipsosaurus dorsalis*) and flat-tailed horned lizard (*Phrynosoma mcallii*), a BLM-designated sensitive species, have been observed within the proposed transmission line routes. Other common reptile species known in the region and expected to occur within the proposed routes include the long-tailed brush lizard (*Urosaurus graciosus*), side-blotched lizard (*Uta stansburiana*), long-nose leopard lizard (*Gambelia wislizenii*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), coachwhip (*Masticophis flagellum*), sidewinder (*Crotalus cerastes*), western patch-nosed snake (*Salvodora hexalepis*), western shovelnosed snake (*Chionactis occipitalis*), and spotted leaf-nosed snake (*Phyllorhynchus decurtatus*) (Loeffler 2001).

Eleven species of birds were observed during surveys within the proposed transmission line routes (Loeffler 2001). Commonly observed species included yellow-rumped warbler (*Dendroica coronata*) and white-crowned sparrow (*Zonorichia leucophrys*). Two wintering species, blue-gray gnatcatcher (*Polioptila caerulea*) and rock wren (*Salpinctes obsoletus obsoletus*), potentially breed within the area. Raptors observed during the surveys included red-tailed hawk (*Buteo jamaicensis*) and prairie falcon (*Falco mexicanus*). In addition, a western burrowing owl (*Speotyto cunicularia hypugaea*), a BLM-designated sensitive species, was observed within one of the small desert washes south of State Route 98 (Section 3.4.4.17).

A variety of mammal species utilize the Sonoran creosote bush scrub and desert dry wash plant communities for cover and as foraging areas. Desert black-tailed jackrabbit (*Lepus californicus deserticola*), cottontail rabbit (*Sylvilagus audubonii*), round-tailed ground squirrel (*Spermophilus tereticaudus tereticaudus*), coyote (*Canis latrans*), and desert kit fox (*Vulpes macrotis*) are present within the vicinity of the applicants' proposed transmission line routes and the alternative routes, either on the basis of observations involving individuals, scat, or burrows. Other species that commonly occur in the region and that are expected to occur within the vicinity of the proposed and alternative transmission line routes include badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and raccoon (*Procyon lotor*). Mule deer (*Odocoileus hemionus*) and mountain lion (*Felis concolor*) are occasionally observed within the region and could also occur along the proposed and alternative transmission line routes (Loeffler 2001).

3.4.1.3 Aquatic Biota

The proposed transmission line routes and the alternative routes would pass through desert areas where no permanent aquatic habitats are present. The desert washes within the vicinity of the proposed routes contain standing water only following rare rainfall events, and are dry during most the year. As a consequence, there are no aquatic biota within the vicinity of the proposed and alternative transmission line routes.

3.4.2 New River Corridor

Relatively few surveys of ecological resources have been conducted within the New River corridor. The information presented here for vegetation and terrestrial wildlife is primarily based on surveys conducted during 2002 (BOR 2002). These surveys focused on 26 sites distributed along the U.S. portion of the New River from near the U.S.-Mexico border to the Salton Sea. While these were not highly detailed quantitative surveys, they do provide useful information about the habitats and biota that occur along the New River corridor.

3.4.2.1 Vegetation Communities

The riparian (shoreline) vegetation along the length of the New River from the U.S.-Mexico border to the Salton Sea primarily consists of four different vegetation community types: tamarisk series, iodine bush series, mixed saltbush series, and common reed series (BOR 2002). In addition, agricultural fields are immediately adjacent to the New River in some areas. The identified riparian communities are generally evident as bands of vegetated thickets that are denser and taller than the adjacent desert scrub habitats found outside of the more flood-prone areas immediately along the river shoreline. During a 2002 survey of 26 sites along the New River, it was found that tamarisk, iodine bush (*Allenrolfia occidentalis*), saltbush, common reed (*Phragmites australis*), and mesquite were the dominant plant species in the New River riparian zone (BOR 2002). A long narrow delta has formed where the New River enters the Salton Sea. This delta, which is within the Sonny Bono Salton Sea National Wildlife Refuge, supports a narrow strip of riparian vegetation that consists primarily of mature tamarisk and common reed (BOR 2002).

Two constructed wetland areas have been developed adjacent to the New River as part of a pilot project examining the feasibility of using constructed wetlands to improve water quality in the New River. The southernmost of these wetlands, known as the Imperial wetland (Figure 3.2-1), withdraws water from the Rice Drain. After water passes through the wetland area, it is discharged into the New River. The northern wetland area, known as the Brawley wetland, withdraws water directly from the New River near Brawley, California (Figure 3.2-1) by pump. As with the Imperial wetland, water is discharged into the New River after passing through the wetland area. Plant species in these two wetland areas include bulrushes (*Scirpus* spp.), broadleaf cattail (*Typha latifolia*), umbrella flatsedge (*Cyperus eragrostis*), and littlebeak spikerush (*Eleocharis rostellata*), in addition to other wetland species (BOR 2002).

3.4.2.2 Terrestrial Wildlife

The dense riparian vegetation associated with the New River provides habitat for a variety of bird and mammal species and often supports high densities of game species such as desert cottontail (*Sylvilagus audubonii*), Gambel's quail (*Lophortyx gambeli*), and mourning dove (*Zenaida macroura*) (Brown 1994). BOR (2002) reported that 36 species of wildlife, including 29 bird species, were observed during surveys conducted along the New River in 2002. Bird species associated with the riparian zone included cliff swallow (*Petrochelidon pyrrhonota*), great-tailed grackle (*Quiscalus mexicanus*), red-winged blackbird (*Agelaius phoeniceus*), and black phoebe (*Sayornis nigricans*). In addition, a variety of shorebirds and waterfowl utilize the New River corridor and the constructed Imperial and Brawley wetlands, including great blue heron (*Ardea herodias*), green-backed heron (*Butorides striatus*), American coot (*Fulica americana*), and mallard (*Anas platyrhynchus*). Amphibians and reptiles observed during surveys included bullfrog (*Rana catesbeiana*), long-tailed brush lizard (*Urosaurus graciosus*), and several unidentified species of turtles. Mammals observed in the vicinity of the riparian zone included California ground squirrel (*Spermophilus beecheyi*), muskrat (*Ondatra zibethicus*), and striped skunk (*Mephitis mephitis*) (BOR 2002).

3.4.2.3 Aquatic Biota

As described in Section 3.2.1.1, the channel of the New River was largely formed between 1905 and 1907 as a result of a breach in the Imperial Canal. Prior to this, the New River was normally a dry channel. Consequently, aquatic organisms have been able to become established in the New River only since the early 1900s. The establishment of biological communities in the New River has been greatly affected by the introduction of treated and untreated wastewater, industrial discharge, and agricultural runoff. However, there is relatively little information about the current status of aquatic organisms in the New River.

Setmire (1984) reported that phytoplankton (primarily drifting algae) in the New River between Calexico and the Salton Sea were mainly pollution-tolerant species. In addition, the concentrations and number of types of phytoplankton were highest near the U.S.-Mexico border and decreased as the river flowed toward the Salton Sea. Setmire attributed this decrease primarily to increasing turbidity as the New River flowed toward the Salton Sea and received additional sediment from agricultural runoff.

Setmire (1984) also examined benthic invertebrates (animals that lack a backbone and inhabit the bottom of streams and other aquatic habitats) in the New River. Invertebrates collected from the river included aquatic worms and larval forms of midges. Few species and a very low number of individual organisms were found in samples collected from the river at the U.S.-Mexico border at Calexico and 8.5 mi (13.7 km) downstream. A greater number of individuals and greater species diversity were found in samples obtained at sample stations located 36 and 61 mi (58 and 98 km) from the U.S.-Mexico border. On the basis of species diversity and the numbers and types of organisms collected, Setmire (1984) concluded that the water quality at Calexico and at the station located 8.5 mi (13.7 km) downstream was of such poor quality that very little animal life could exist. However, while the presence of particular invertebrate species indicated that pollution stress was still occurring at locations farther downstream, water quality improved and became more suitable for supporting invertebrate communities as the water flowed downstream toward the Salton Sea.

No quantitative information exists about the distribution and abundance of fish species in the New River. However, the Colorado River Basin Regional Water Quality Control Board has collected fish from the New River since 1978 for analysis of chemical concentrations in tissues as part of the Toxic Substance Monitoring Program. The DOI conducted other studies of contaminants in fish from the New River in 1987 through 1988 (Setmire et al. 1990) and 1988 through 1990 (Schroeder et al. 1993; Setmire et al. 1993). Table 3.4-1 lists the fish species identified during these studies. Some of these species, such as redbelly tilapia and longjaw mudsucker, are most likely to occur near the downstream end of the New River near the Salton Sea where water quality is better. Other species (e.g., mosquitofish, common carp, and yellow bullhead) that are relatively tolerant of poor water quality and are known to occur in many of the agricultural drainages that enter the New River, may occur along a substantial portion of the New River itself.

3.4.3 Salton Sea

3.4.3.1 Vegetation Communities

Vegetation is generally sparse along the shoreline of the Salton Sea and consists primarily of plants adapted to habitats with limited water. The principal terrestrial vegetation communities in areas without perennial supplies of water (e.g., springs, rivers, or irrigation ditches) are various subcategories of Sonoran desert scrub, including Sonoran creosote bush scrub (as described previously for the proposed transmission line routes), Sonoran desert mixed scrub, and Sonoran mixed and woody succulent scrub. Irrigated agricultural land constitutes a large component of the vegetated areas surrounding the southern end of the Salton Sea where the New River flows into the

TABLE 3.4-1 Fish Species in the New River

Common Name	Scientific Name
Channel catfish	*Ictalurus punctatus*
Common carp	*Cyprinus carpio*
Flathead catfish	*Pylodictis olivaris*
Longjaw mudsucker	*Gillichthys mirabilis*
Mosquitofish	*Gambusia affinis*
Redbelly tilapia	*Tilapia zilli*
Sailfin molly	*Poecilia latipinna*
Tilapia	*Tilapia sp.*
Yellow bullhead	*Ameiurus natalis*

Sources: Setmire et al. (1990, 1993); Schroeder et al. (1993).

Sea, although riparian vegetation is present in the vicinity of the New River and Alamo River deltas (Salton Sea Authority and BOR 2000).

A considerable amount of managed saltwater, brackish, and freshwater marsh habitat is present along the southern shoreline of the Salton Sea. Typical vegetation in brackish and salt-marsh habitats includes salt grass (*Distichlis spicata*), alkali bulrush (*Scirpus maritimus*), cattail, common reed, and giant bulrush (*Scirpus californicus*). Freshwater marshes are typically present as scattered stands that are dominated by common reed, cattail, golden dock (*Rumex maritimus*), and rabbitfoot grass (*Polypogon monspeliensis*) (Brown 1994; Salton Sea Authority and BOR 2000). The Sonny Bono Salton Sea National Wildlife Refuge, situated along the Salton Sea in the vicinity of the New River and Alamo River deltas, manages approximately 35,000 acres (14,164 ha) of brackish and salt-marsh habitats and 2,000 acres (809 ha) of freshwater marsh and pasture, in order to provide habitat for migratory birds and waterfowl (USFWS 2003a). In many locations, the edges of the Salton Sea's open water areas are surrounded by large expanses of unvegetated mudflats that serve as feeding areas for some bird species.

3.4.3.2 Terrestrial Wildlife

The Sonoran desert scrub habitats surrounding the Salton Sea contain fauna similar to that described for the proposed transmission line routes above. However, the salt-marsh, freshwater marsh, and mudflat habitats of the Salton Sea provide important nesting, refuge, and feeding areas for a wide variety of birds and waterfowl that do not utilize drier desert habitats. More than 400 bird species have been reported from the Salton Sea and, on average, more than 1.5 million birds are supported annually (Salton Sea Authority and BOR 2000). This includes a number of special status bird species, including Federal- and State-listed threatened and endangered species. Special status species are discussed in Section 3.4.4.

Because the Salton Sea lies within a basin that extends southward to the Gulf of California and has mountainous barriers on the western, northern, and eastern sides, it commonly attracts seabirds, shorebirds, and waterfowl that are normally associated with coastal environments (Patten et al. 2003). Examples of such species include brant (*Branta bernicla nigricans*), scoters (*Melanitta* spp.), ruddy turnstone (*Arenaria interpes interpes*), red knot (*Calidris canutus*), California brown pelican (*Pelicanus occidentalis californicus*), and yellow-footed gull (*Larus livens*). Even species that are considered to be open ocean species, such as Laysan albatross (*Phoebastria immutabilis*) and shearwaters (*Puffinis* spp.), are occasionally observed at the Salton Sea (Patten et al. 2003).

The heaviest use of the Salton Sea by birds occurs in the vicinity of areas with freshwater inflow to the Sea. This includes the area surrounding the mouth of the Whitewater River at the northern end, on the eastern side of the Sea near the mouth of Salt Creek, and at the southern end of the Sea near the mouths of the Alamo and New Rivers (Salton Sea Authority and BOR 2000). More than 375 species of birds have been observed at the Sonny Bono Salton Sea National Wildlife Refuge at the southern end of the Sea. Up to 30,000 snow (*Chen caerulescens caerulescens*), Ross's (*Chen rossii*), and Canada geese (*Branta canadensis*), and up to

60,000 ducks (mostly ruddy ducks and eared grebes) use the refuge daily during winter months (Krantz 2002; USFWS 2003b). Marsh birds and shorebirds account for more than 6,000,000 use-days each year (USFWS 2003b). Federal-listed species, such as the bald eagle (*Haliaeetus leucocephalus*) and California brown pelican, have been observed, and there is a population of Yuma clapper rail (*Rallus longirostris yumanensis*) that nests at the refuge. The State-listed peregrine falcon (*Falco peregrinus anatum*) has also been observed. Section 3.4.4 contains a discussion of listed species.

The primary sources of food for birds using the Salton Sea are fish and aquatic invertebrates. However aquatic plants, terrestrial invertebrates, amphibians, and reptiles along shorelines and in the adjacent wetlands and agricultural drainage systems also provide significant sources of food for many species. Some bird species, such as cattle egret (*Bubulcus ibis ibis*), geese, and white-faced ibis (*Plegadis chihi*), roost at the Salton Sea but obtain food largely from adjacent agricultural fields and natural habitats (Salton Sea Authority and U.S. BOR 2000).

3.4.3.3 Aquatic Biota

Aquatic habitats at the Salton Sea are associated with freshwater marsh, salt marsh, open water, and mudflats. This section describes the aquatic habitats and the aquatic biota in the Salton Sea, including phytoplankton, aquatic invertebrates, and fish. In addition, the history and current status of Salton Sea sport fishery are presented.

Although the Salton Sea aquatic ecosystem can be characterized as having a relatively low number of species, it has a high rate of productivity that is capable of supporting a large number of individuals of the species that do occur. This productivity results from the high input of nutrients via irrigation drain water. High nutrient levels, together with warm water temperatures and a high level of solar energy input from the sun, encourage rapid production of phytoplankton and benthic algae, which, in turn, supports a high rate of production of the small aquatic organisms that feed on them, such as zooplankton (small animals suspended in the water column) and benthic worms. These small organisms provide a rich food source for fish and birds. However, at times, the decomposition of algal blooms that result from excess nutrients can reduce DO in some areas of the Sea to levels that result in mortality of fish and other aquatic organisms. Such conditions have been implicated in periodic fish kills in some areas.

The zooplankton community of the Salton Sea primarily consists of ciliates, rotifers, copepods, brine shrimp (*Artemia franciscana*), and the larvae of barnacles (*Balanus amphitrite*), pileworms (*Neanthes succinea*), and fish (Salton Sea Authority and BOR 2000). Adult barnacles form mats that line some shoreline areas, and adult pileworms dominate the benthic invertebrate community. Pileworms are especially important in processing detritus and are prominent in nearly all of the food chains of the Salton Sea. Consequently, the loss of pileworms in the Salton Sea would likely affect the survival of multiple other species.

As described in Section 3.2, the current Salton Sea was formed as a result of floods in 1905 through 1907 that broke through irrigation headworks intended to divert water from the Colorado River into the Imperial Valley. Although the initial fish fauna in the newly formed

Salton Sea reflected the freshwater species typically found in the Colorado River and in irrigation drainages, these species were unable to survive, as evaporation of water over the years led to increased salinity. Beginning in the 1950s, the California Department of Fish and Game introduced more than 30 species of marine fish into the Salton Sea from the Gulf of California (Walker et al. 1961). Of these, only the orangemouth corvina (*Cynoscion xanthulus*), bairdiella (*Bairdiella icistia*), and sargo (*Anisotremus davidsoni*) became established. Two species of tilapia (Mozambique tilapia [*Oreochromis mossambicus*] and Zill's tilapia [*Tilapia zillii*]) became established in the Salton Sea after being accidentally introduced in 1964 through 1965. Tilapia are nonnative fish species from Africa that escaped to the Salton Sea from an aquaculture operation and from irrigation ditches where they had been stocked (Riedel et al. 2003). Together, orangemouth corvina, croaker, sargo, and tilapia form the basis of the fishery in the Salton Sea.

Orangemouth corvina is a native of the Gulf of California, and although it only constitutes about 3% of the catch, it is currently considered the primary game fish in the Salton Sea (Riedel et al. 2003). Although young orangemouth corvina feed mostly on zooplankton, pileworms, and other invertebrates, adults are piscivorous (fish-eating) and serve a valuable ecological role as the top aquatic predator. They grow rapidly in the conditions present in the Salton Sea, reaching an average size of approximately 28 in. (70 cm) by 3 years of age (Riedel et al. 2003). Although sampling suggested that there was a significant decline in the presence of both egg and larval stages of orangemouth corvina between 1987 and 1989 (Matsui et al. 1991), studies conducted in 1999 and 2000 suggested that more recent stocks of orangemouth corvina might be in better condition than the stocks of previous decades (Riedel et al. 2003).

Bairdiella (also known as Gulf croaker) is native to the Gulf of California and can tolerate salinities ranging from freshwater up to at least 45,000 mg/L (Riedel et al. 2003). The bairdiella population in the Salton Sea was established through stocking of 67 individuals in 1950 and 1951 by the California Department of Fish and Game (Walker et al. 1961), and it is currently the second-most-abundant fish in the Sea. Although it does not represent a substantial part of the fishery in the Salton Sea, bairdiella is occasionally caught by anglers (Riedel et al. 2003). Bairdiella is a small fish that grows to about 10 in. (25 cm) in length. Early young feed primarily on zooplankton and fish eggs, while larger individuals feed primarily on pileworms (Quast 1961). Bairdiella serves as an important forage fish for orangemouth corvina. Riedel et al. (2003) reported that the bairdiella population in 1999 was consistently larger than that reported in an earlier study (Whitney 1961).

Sargo is a schooling fish species that is found from southern Baja California to the northern Gulf of California. Relatively little information is available about the life history of this species in the Salton Sea. Sargo are typically associated with the Sea bottom and feed on benthic organisms such as pileworms and barnacles. Sargo also serve as food for corvina. The sargo reaches an average size of about 10 in. (25 cm) at around 2 years of age (Riedel et al. 2003). Although sargo were once considered a popular game fish, they are currently not abundant in the Salton Sea. It is unclear, however, whether the population is declining (Riedel et al. 2003).

Tilapia can tolerate a wide range of salinity levels, and after salinity in the Salton Sea exceeded 35,000 mg/L in the 1970s, tilapia became the dominant fish species. The actual species composition of the tilapia present in the Salton Sea is unclear, and it is believed that the current stock represents hybrids among three different species — Mozambique tilapia, Zill's tilapia, and Wami River tilapia (*Oreochromis urolepis hornorum*) (Riedel et al. 2003). Tilapia grow to be approximately 16 in. (40 cm) in length and feed on plankton, insects, larval fishes, benthic invertebrates, and plant material. Tilapia currently serve as the most important prey item for orangemouth corvina and fish-eating birds (e.g., pelicans), and also as a popular recreational fish. Although tilapia have a very high salinity tolerance, water temperatures below about 59°F (15°C) have been shown to greatly reduce survival (Riedel et al. 2003). As a consequence, large numbers of tilapia periodically die at the Salton Sea during periods of unusually cold weather.

Although not important from a commercial or recreational fishery perspective, several other fish species occur in the Salton Sea. These species include the sailfin molly (*Poecilia lattipinna*), longjaw mudsucker (*Gillichthys mirabilis*), mosquitofish (*Gambusia affinis affinis*), and desert pupfish (*Cyprinodon macularius*). The desert pupfish, which is the only native species in the Salton Sea, is listed as endangered by both the State of California and the Federal government. Additional information about the desert pupfish is provided in Section 3.4.4.

The sailfin molly is a small fish that is popular with tropical fish hobbyists. It is believed to have escaped into the Salton Sea from tropical fish farms in the 1960s (Salton Sea Authority and BOR 2000). The sailfin molly can tolerate a wide range of salinities, and adults can reportedly withstand salinities as great as 80,000 mg/L (Salton Sea Authority and BOR 2000). In the vicinity of the Salton Sea, it is usually found in freshwater and saltwater marshes and in irrigation ditches. It feeds primarily on plants and small invertebrates, including insect larvae.

The longjaw mudsucker is a small fish that has a native distribution from central California to the Gulf of California. It was introduced into the Salton Sea in 1930 and is mostly found nearshore around cover and in quiet water. It can tolerate very high salinities and has been collected in waters with salinities up to 83,000 mg/L (Salton Sea Authority and BOR 2000). The diet of the longjaw mudsucker consists primarily of invertebrates, although adult fish will also occasionally prey upon small desert pupfish and tilapia. Walker et al. (1961) reported that longjaw mudsucker are eaten by orangemouth corvina in some seasons.

Mosquitofish have been widely distributed in California since 1922, when the species was first introduced to control mosquitoes (Kimsey and Fisk 1969). In the Salton Sea, mosquitofish are most commonly found in the vicinity of freshwater inflows; this species can also tolerate brackish water conditions. Although mosquitofish feed primarily on small invertebrates, they will also eat larval fishes. Predation and competition by mosquitofish have been implicated as potential reasons for the decline of the desert pupfish in the vicinity of the Salton Sea.

3.4.4 Special Status Species

Special status plant and wildlife species are subject to regulations under the authority of Federal and State agencies. Special status species include those species that are listed or being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) (i.e., Federal endangered, threatened, proposed, or candidate species), that are designated by BLM as sensitive species, or that are listed as threatened or endangered by the State of California. (In addition, the State of California maintains lists of California Rare Plants, California Special Plants and Animals, and Fully Protected Animals [CDFG 2003]. Some of the species on these California lists are also listed as threatened or endangered at either or both the State and Federal level.)

No plant or animal species listed as threatened or endangered by the USFWS or the California Department of Fish and Game were observed during surveys conducted in the vicinity of the existing transmission line corridor (Loeffler 2001). Two BLM-designated sensitive species, the flat-tailed horned lizard and western burrowing owl, were observed. Federal-listed threatened and endangered species, and their designated or proposed critical habitats, are afforded protection under the Federal Endangered Species Act. California-listed threatened and endangered species are protected under the State's Endangered Species Act of 1984.

The list of Federal- and State-listed threatened and endangered species that could be present within areas potentially affected by the projects (i.e., the proposed transmission line routes, the New River and adjacent riparian areas, and the Salton Sea) was developed through consultation with the USFWS (O'Rourke 2004) and with the California Department of Fish and Game. Appendix E contains copies of consultation letters from the USFWS and the California Department of Fish and Game. California species of special concern that could occur along the proposed or alternative transmission line routes, the New River, or the Salton Sea, are not included in this section. California species listed as threatened or endangered are included in Table 3.4-2.

3.4.4.1 Peirson's Milk-Vetch (*Astragalus magdalenae* var. *peirsonii*)

Peirson's milk-vetch is listed as endangered under the California Endangered Species Act and threatened under the Federal Endangered Species Act. It is a silvery, short-lived perennial plant that is somewhat broom-like in appearance. A member of the pea and bean family, it can grow to 2.5 ft (0.8 m) tall and is notable among milk-vetches for its greatly reduced leaves. Peirson's milk-vetch produces attractive, small purple flowers, generally in March or April, with 10 to 17 flowers per stalk. It yields inflated fruit similar to yellow-green pea pods with triangular beaks.

Peirson's milk-vetch has the largest seeds of any milk-vetch. Large seeds are an important adaptation in dune plants. While small seeds can readily germinate under several inches of moist sand, they may exhaust their stored food before the seedling can emerge from the sand at such depths and begin producing its own food. Large seeds provide a greater reservoir of stored food and enable seedlings to grow a greater distance before emergence and/or depletion of their stored energy.

Pierson's milk-vetch occurs on well-developed desert dunes. In the United States, the plant is known only from the Algodones Dunes (Imperial Sand Dunes); in nearby Mexico, from a limited area of dunes within the Gran Desierto in the northwestern portion of the State of Sonora. It does not occur in the Yuha Desert in the vicinity of the proposed transmission line routes, along the New River corridor, or in the vicinity of the Salton Sea.

3.4.4.2 Algodones Dunes Sunflower (*Helianthus niveus* ssp. *tephrodes*)

The Algodones Dunes sunflower is listed as endangered by the State of California. It is a silvery-white, semi-shrubby perennial in the sunflower family (Asteraceae). The Algodones Dunes sunflower has a woody base, large hairy leaves, and reddish-purple centered flowers surrounded with bright yellow rays. It occurs on unstabilized sand dunes and is known only from the Algodones Dunes system of Imperial County. Recreational use of off-highway vehicles has destroyed a large portion of the vegetation in areas of the Algodones Dunes open to public use, and this is considered to be a major threat to the species (CDFG 2000a). This species does not occur in the vicinity of the proposed transmission line routes or in the vicinity of the New River or the Salton Sea.

3.4.4.3 Desert Pupfish (*Cyprinodon macularis*)

The desert pupfish is a small (up to 3 in. [8 cm] in length) freshwater fish known to occur in isolated southwestern desert drainage systems, including tributaries to the Salton Sea. The desert pupfish is the only native fish species in the Salton Sea and is listed as endangered by the Federal government and the State of California.

The desert pupfish was abundant along the shore of the Salton Sea through the 1950s (Barlow 1961). Numbers declined during the 1960s, and by 1978, pupfish were noted as scarce and sporadic. Declines are thought to have resulted from the introduction of nonnative fish into the Salton Sea (USFWS 1993; Sutton 1999). Surveys conducted around the Salton Sea indicated that desert pupfish were present in a number of canals and shoreline pools on the southern and eastern margins of the Salton Sea and in small pools in Felipe Creek, Carrizo Wash, and Fish Creek Wash near the Salton Sea (Sutton 1999). Localities also include agricultural drains in the Imperial and Coachella Valleys, shoreline pools around the Salton Sea, the mouth of Salt Creek in Riverside County, lower San Felipe Creek and its associated wetlands in Imperial County, and in artificial refuge ponds (Sutton 1999).

The desert pupfish is an opportunistic feeder whose diet consists of algae, minute organisms associated with detritus, insects, fish eggs, and small crustaceans (USFWS 1993; Sutton 1999). It is not considered an important food for wading birds and other fish in the Salton Sea because of its low numbers (Walker et al. 1961; Barlow 1961).

The desert pupfish has a high tolerance for extreme environmental conditions, including wide ranges of temperature, DO and salinity. Barlow (1958) reported that adult desert pupfish survived salinity as high as 98,100 mg/L in the laboratory. Although the desert pupfish is extremely hardy in many respects, it prefers quiet water with aquatic vegetation. It cannot tolerate competition or predation and is readily displaced by exotic fishes (USFWS 1993).

Because desert pupfish prefer shallow, slow-moving waters with some vegetation for feeding and spawning habitat, shallow pools in the Salton Sea probably do not provide an optimal habitat. Desert pupfish are not known to occur, nor are they expected to occur, in the New or Alamo Rivers because of the high sediment loads, excessive velocities, and the presence of predators (Sutton 1999).

3.4.4.4 Desert Tortoise (*Gopherus agassizii*)

The desert tortoise is listed as threatened by both the Federal government and the State of California. It is a medium-sized tortoise with an adult carapace length of about 8 to 14 in. (20 to 36 cm). Males, on average, are larger than females and are distinguished by having a concave plastron, longer gular horns, larger chin glands on each side of the lower jaw, and a longer tail. Carapace color varies from light yellow-brown (horn color) to dark grey-brown. A composite of characteristics often is necessary to distinguish the desert tortoise from the other species of gopher tortoises, but its most unique feature is its very large hind feet.

The desert tortoise is widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, western and southern Arizona, and throughout most of Sonora, Mexico. In the Salton Trough, desert tortoise occurs near San Gorgonio Pass and on the alluvial fans of Coachella Valley (USFWS 1994). This widespread and once common species is rapidly decreasing in numbers due to habitat destruction from off-road vehicle use, agriculture, mining, and urban and residential development. Other factors contributing to the overall decline of the desert tortoise include the spread of a fatal respiratory disease and increases in raven populations that prey on juvenile tortoises. Recent data indicate that many local subpopulations have declined precipitously. The appearance of Upper Respiratory Disease Syndrome, not identified in wild tortoises before 1987, may be a contributing factor (USFWS 1994).

Desert tortoise populations are known from many locations throughout the Mojave and Sonoran Deserts of the Southwest. Throughout its geographical range, the desert tortoise typically is found at elevations of 3,500 to 6,000 ft (1,067 to 1,829 m). In Arizona, they have been found as low as 500 ft (152 m) (Mojave Valley, Mojave County) and as high as 5,200 ft (1,585 m) (east slope of the Santa Catalina Mountains, Pima County). Sonoran Desert tortoise shelter sites most often occur on rocky slopes or in washes that dissect the desert scrub. The desert tortoise does not occur in the Imperial Valley, and the nearest known populations to the area of the projects occur in the Chocolate Mountains to the east.

The desert tortoise requires crumbly, well-drained, sandy soil to construct nesting burrows. They are not found in areas of very cobbly soil or areas with soil types too soft to construct a burrow, or in dry lakes. In the Mojave Desert, the desert tortoise is most often found in association with creosote bush, Joshua tree woodland, and saltbush scrub vegetation communities. The known range for the desert tortoise does not include the desert in the vicinity of the proposed transmission lines, and surveys conducted in the vicinity of the proposed projects did not find indications of use by desert tortoise (Loeffler 2001). Suitable habitat does not occur in the vicinity of the New River or along the southern shorelines of the Salton Sea.

3.4.4.5 Barefoot Gecko (*Coleonyx switaki*)

The barefoot gecko is a medium-sized lizard, 2 to 3 in. (5 to 8 cm) long, with soft skin, fine, granular scales, and a grey-brown body with various black and white spots and bands. This species is known only from five localities in eastern San Diego County and western Imperial County and is listed by the State of California as threatened. It inhabits rocky, boulder-strewn desert foothills and is usually found in areas of massive rocks and rock outcrops at the heads of canyons. The barefoot gecko is nocturnal and insectivorous and spends most of its life deep in rock crevices and subterranean chambers. Because of its limited distribution and the absence of suitable habitat, this species is not expected to occur within the vicinity of the proposed transmission line routes, along the New River, or in the vicinity of the Salton Sea.

3.4.4.6 Flat-Tailed Horned Lizard (*Phrynosoma mcallii)*

The flat-tailed horned lizard is a BLM-designated sensitive species and a California Department of Fish and Game species of special concern (CDFG 2003).

In early 2003 (68 FR 331; January 3, 2003), the USFWS withdrew a proposed rule to list the species as threatened. The USFWS had determined that threats to the species identified in a proposed rule were not as significant as earlier believed, and that the threats to the species and its habitat were not likely to endanger the species in the foreseeable future throughout all or a significant portion of its range.

The distribution of the flat-tailed horned lizard ranges from the Coachella Valley to the head of the Gulf of California and southwestern Arizona. The species typically occurs in areas with fine, sandy soils and sparse desert vegetation. It is also found in areas consisting of mudhills and gravelly flats. The species has declined because of habitat destruction for agriculture and development.

This species was observed during recent surveys and has been observed within the survey corridor during directed surveys conducted by BLM since 1979. In addition, the survey corridor is located within an identified management area, the Yuha Desert Management Area, for the flat-tailed horned lizard (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). Given the homogeneity of the habitat and the fact that the survey corridor is located within a management area, the entire survey corridor is considered to support the species.

3.4.4.7 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles visit the Salton Sea area during annual migrations to forage on fish and other food resources along the shoreline of the sea. Nesting does not occur in the Salton Sea area, but trees in the area provide important habitat for roosting. Although bald eagles may occur within the area, substantial use of the New River or the desert in the vicinity of the proposed transmission line routes is unlikely due to limited foraging opportunities. There is a possibility that bald eagles could occasionally use transmission towers within the transmission line routes as perches.

3.4.4.8 Brown Pelican (*Pelecanus occidentalis*)

The California brown pelican (*Pelecanus occidentalis californicus*) is found primarily in estuarine, marine subtidal, and open waters. Nesting colonies are found on the Channel Islands, the Coronado Islands, and on islands in the Gulf of California. Historically, there was little use of the Salton Sea by brown pelicans, which were first confirmed overwintering at the Sea in 1987. The Salton Sea currently supports a year-round population of California brown pelicans, sometimes reaching 5,000 birds. The brown pelican nested successfully at the Salton Sea in 1996 (nine young produced) and unsuccessfully attempted to nest in 1997 and 1998 (Patten et al. 2003).

Brown pelicans are plunge divers, often locating fish from the air and diving into the water to catch them. They typically congregate at selected roosting locations that are isolated from human activity. Approximately 1,100 brown pelicans died at the Salton Sea from avian botulism in 1996, the largest die-off to date of pelicans in the United States (USFWS 2004).

3.4.4.9 California Least Tern (*Sterna antillarum browni*)

The California least tern usually nests on coastal beaches and estuaries near shallow waters. Nest sites are located on sand or fine gravel (sometimes mixed with shell fragments) in open areas where they have good visibility for long distances to see the approach of predators. This species is a rare spring and summer visitor to the Salton Sea, but apparent increases in sightings over the past decade may indicate that breeding is occurring at the Salton Sea (Patten et al. 2003). In the Salton Sea area, it is most commonly observed on mudflats near the deltas of the New, Alamo, and Whitewater Rivers and may also forage in nearby rivers or ponds areas (Patten et al. 2003). Although the California least tern occurs in the Salton Sea and may occasionally feed in the New River, it is unlikely that this species would nest along the New River because of the absence of suitable nesting areas.

3.4.4.10 Least Bell’s Vireo (*Vireo bellii pusillus*)

The least Bell’s vireo occurs in riparian areas along the lower Colorado River. Nesting habitat of the least Bell’s vireo typically consists of well-developed overstories and understories and low densities of aquatic and herbaceous cover. Least Bell’s vireo occurs accidentally in the Salton Sea and New River area during migration. This low level of use is reflected by only two observations of this species at the Sonny Bono Salton Sea National Wildlife Refuge (Patten et al. 2003).

3.4.4.11 Gila Woodpecker (*Melanerpes uropygialis*)

In California, Gila woodpeckers are distributed along the lower Colorado River and occur locally near Brawley in the Imperial Valley. This species typically occurs in desert riparian and desert dry wash woodland habitats but also is found in orchard-vineyard and residential habitats. It formerly was common in the Imperial Valley and was recorded as far north as Coachella Valley at the north end of the Salton Sea. The decline of this species may be attributed to the clearing of riparian woodlands and to competition with introduced European starlings for nesting cavities. Gila woodpeckers eat insects, berries, and cactus fruits, and they nest in cavities of saguaro cacti or riparian trees.

3.4.4.12 Yuma Clapper Rail (*Rallus longirostris yumanensis*)

The Yuma clapper rail is a year-round resident at the Salton Sea and along the lower Colorado River into Mexico (CDFG 1999). Between 1990 and 1999, on average, 365 rails were counted around the Salton Sea, an estimated 40% of the entire U.S. population of this species (Shuford et al. 2000). Yuma clapper rails occur at the south end of the Salton Sea near the New and Alamo River mouths, at the Sonny Bono Salton Sea National Wildlife Refuge, at the Wister Waterfowl Management Area, the Imperial Wildlife Area, and other locations.

The Yuma clapper rail probes in freshwater and saltwater emergent wetlands for aquatic and terrestrial invertebrates and occasionally for small fish. Nests are built in emergent vegetation. The declines in Yuma clapper rail populations have been primarily attributed to loss of marsh habitat (CDFG 1999).

3.4.4.13 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The USFWS listed the southwestern willow flycatcher as endangered in February 1995 because of “loss of riparian breeding habitat, nest parasitism by the brown-headed cowbird (*Molothrus ater*), and a lack of adequate protective regulations.” This subspecies was listed as endangered by the California Department of Fish and Game in December 1990. Large numbers of willow flycatcher pass through southern California deserts during spring and fall migration (CDFG 2004). It is difficult to differentiate between the endangered subspecies that breeds in southern California and the nonendangered subspecies (*E. t. brewsteri*) that breeds to the north in the Sierra Nevada and Cascade Mountain ranges. There is a period of overlapping occurrence in southern California riparian habitats for these two very similar looking subspecies during spring and fall migrations. At the Salton Sea, willow flycatcher, of undetermined subspecies status, is a common spring and fall migrant (Patten et al. 2003).

Southwestern willow flycatchers nest in riparian habitat characterized by dense stands of intermediate-sized shrubs or trees, such as willows, usually with an overstory of scattered larger trees, such as cottonwoods (*Populus fremontii*). With the loss of preferred habitat throughout the Southwest, southwestern willow flycatchers have been observed utilizing tamarisk thickets for nesting. Because such tamarisk thickets occur along the length of the New River, it is possible that this species could occasionally nest in the area of the projects.

3.4.4.14 Bank Swallow (*Riparia riparia*)

The bank swallow, considered threatened by the State of California, historically was considered locally common in the lowland regions of California. The species has been extirpated from much of its former nesting range, including all known historical locations in southern California. The bank swallow migrates through the Salton Sea area in April and again in September on its way between South America and its remaining nesting areas in northern California.

3.4.4.15 Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis*)

The western yellow-billed cuckoo, a candidate for listing by the Federal government and listed as threatened by the State of California, once nested from Mexico to southern British Columbia. In California, remnant populations breed along sections of seven rivers, including the Colorado River in the southern part of the state. The yellow-billed cuckoo suffered from wholesale destruction of riparian habitat in California over the last 100 years. Although the yellow-billed cuckoo has not been observed recently in the Salton Sea area, suitable habitat does exist in some of the upper reaches of streams draining into the Sea, such as the Whitewater River.

3.4.4.16 Elf Owl (*Micrathene whitneyi*)

The elf owl, considered endangered by the State of California, is the smallest owl in North America. It is approximately 5.5 in. (13.9 cm) long, with a short tail, yellow eyes, a white breast with rust or brown streaks, and plumage spotted with buff and white on a gray or brown base. The elf owl is migratory and only occurs during the breeding season in California, arriving in March and leaving in October. Almost 70% of the records of elf owls in California come from April and May, which is the height of the breeding season (CDFG 2000b).

The elf owl uses cottonwood-willow and mesquite riparian zones along the lower Colorado River. Nesting requires cavities in larger trees with thick walls. Historically, elf owls were recorded at six sites in California. Two of these were near the Colorado River, one about 4 mi (6 km) and the other about 16 mi (26 km) north of Yuma. The other sites were at desert oases west and southwest of Blythe; one was as far from the Colorado River as Joshua Tree National Monument. There are no reports of this species occurring in the vicinity of the proposed transmission line routes or along the shoreline of the New River. A single (presumably) migrating individual was observed near the Salton Sea at Calipatria, California, in September 1995 (Patten et al. 2003).

No elf owls were found during a major survey in 1998 of 51 sites along the Colorado River, and including all of the sites where elf owls had been previously located. Again in 1999, no elf owls were heard during surveys of the major sites where elf owls had been located in 1978 and 1987. The reason for the apparent lack of elf owls in California is unknown, and it is possible that the breeding population has been extirpated from California.

3.4.4.17 Western Burrowing Owl (*Speotyto cunicularia hypugaea*)

The western burrowing owl is a BLM-designated sensitive species and a California Department of Fish and Game species of special concern (CDFG 2003). This subspecies is known to nest throughout most of California. It is a year-round resident and nests from February through August, with peak nesting activity during April and May. In Imperial County, it can be found in desert scrub, grassland, and agricultural areas, where it digs its own or occupies existing burrows. Urbanization has greatly restricted the extent of suitable habitat for this species. Other contributions to the decline of this species include the poisoning of prey species and collisions with automobiles.

Burrowing owls are historically known to exist in the general vicinity of the area of the projects (CDFG 2003). One burrowing owl was observed on a sandy bank above the desert wash located in the center of the survey corridor. There is a potential for this species to nest and winter within the survey corridor.

3.4.4.18 Peninsular Bighorn Sheep (*Ovis canadensis*)

Peninsular bighorn sheep are listed as endangered by the Federal government and threatened by the State of California. Peninsular bighorn sheep inhabit dry, rocky, low-elevation desert slopes, canyons, and washes from the San Jacinto and Santa Rosa Mountains near Palm Springs, California, south into Baja California, Mexico. These sheep are known as low-elevation bighorn because they use habitat from a 400- to 4,000-ft (122- to 1,219-m) elevation. Peninsular bighorn sheep eat primarily grasses, shrubs, and forbs. Within the United States, peninsular bighorn are distributed in a metapopulation structure (a group of subpopulations linked by the movement of a limited number of animals) comprised of at least eight subpopulations. In the 1970s, peninsular bighorn sheep were estimated to number nearly 1,200 in the United States and 4,500 to 7,800 in Baja California. Helicopter surveys conducted in the fall of 2002 indicated that approximately 500 peninsular bighorn inhabit the United States. The most recent surveys of Mexico estimate the Baja California Peninsular bighorn population at 2,000 to 2,500.

Principal reasons for the current low population numbers and the endangered status of the peninsular bighorn sheep include (1) disease from domestic cattle; (2) insufficient lamb recruitment; (3) habitat loss, degradation, and fragmentation by urban and commercial development; and (4) predation coinciding with low population numbers.

Typical habitat for the Peninsular bighorn sheep is primarily located to the west of the area of the projects. As a consequence, this species is not expected to occur within the vicinity of the proposed transmission line routes, along the New River, or along the southern edges of the Salton Sea.

3.4.4.19 Palm Springs Ground Squirrel (*Spermophilus tereticaudus chlorus*)

The Palm Springs ground squirrel, a candidate for listing by the Federal government, is a subspecies of the round-tailed ground squirrel that occurs in the Coachella Valley associated with sandy substrates. The current and historical distribution for the Palm Springs ground squirrel is from the San Gorgonio Pass to the vicinity of the Salton Sea. It has not been reported to occur in areas surrounding the southern Salton Sea or the Yuha Desert, and suitable habitat does not occur along the New River.

The Palm Springs ground squirrel is typically associated with sand fields and dune formations, although it does not require active blow sand areas. This small ground squirrel seems to prefer areas where sand accumulates at the base of large shrubs that provide burrow sites and adequate cover. They may also be found in areas where sandy substrates occur in creosote bush scrub and desert saltbush, or desert sink scrub that supports herbaceous growth.

3.5 CULTURAL RESOURCES

Cultural resources include archaeological sites and historic structures and features that are protected under the NHPA. Cultural resources also include traditional cultural properties that are important to a community's practices and beliefs and that are necessary to maintain a community's cultural identity. Cultural resources that meet the eligibility criteria for listing on the *National Register of Historic Places* (NRHP) are considered "significant" resources and must be taken into consideration during the planning of Federal projects. Federal agencies also are required to consider the effects of their actions on sites, areas, and other resources (e.g., plants) that are of religious significance to Native Americans, as established under the American Indian Religious Freedom Act (P.L. 95-341). Native American graves and burial grounds, including human remains, sacred and funerary objects, and objects of cultural patrimony, are protected by the Native American Graves Protection and Repatriation Act (P.L. 101-601).

3.5.1 Background

Human settlement in the Colorado Desert region extends back roughly 10,000 years. While a considerable amount of information has been collected for the Baja Peninsula Region, more archaeological research has taken place on coastal areas rather than inland areas because of the higher density of development on the coast. Evidence of past activities in the area of the projects is primarily associated with Lake Cahuilla, which was formed by the periodic overflowing of the Colorado River into the Salton Basin (Figure 3.1-1). The lake would form every 100 to 150 years (Redlands Institute 2002). Most archaeological sites in the region are associated with this lake.

3.5.1.1 Prehistoric Period

The oldest evidence for people in the Baja Peninsula Region is associated with the San Dieguito Complex (10,000 B.C.–5,000 B.C.). People from this culture appear to have lived primarily along the coast, although some sites have been found inland. Artifacts attributed to this culture include large stone tools that are only worked on one side (unifacial worked stone), stones where flakes were removed in a single direction (unidirectional flake cores), and massive bifacial tools. Tools were made from numerous types of stone. People from this culture appear to have relied on hunting for their main food supply, stopping in any location for short periods of time only (Berryman and Cheever 2001a).

The Pinto Complex (5,000 B.C.–1,500 B.C.) represents a transition to a more refined way of life. This time period is characterized by an expansion into locations away from the coast and a growing reliance on vegetation for food; however, hunting still supplied a major portion of the diet. Artifacts associated with the Pinto Complex include well-made projectile points, knives and scrapers, and grinding stones. The projectile points are large and likely were used on spears rather than arrows. Sites from this time period are found near the margins of old watercourses and dry lakesides.

The period associated with the advent of bow and arrow technology is the Amargosa/Elko Period (1,500 B.C.–900 A.D.). The development of this new technology is identified by the smaller projectile points that appear during this time period. The sites are mainly found on the coast and on the Baja Peninsula Region; some sites from this period, however, have been found inland.

During the late prehistoric to early historic period, the populations had expanded considerably. The groups living in what was to become southern California include the Cahuilla, Tipia, Mohave, Halchidhoma, Quechan, and Copcopa. The area of the projects was inhabited by the Cahuilla and Tipai. These groups had extensive trade networks and relied on horticulture. They utilized Lake Cahuilla when it was present (i.e., when the Colorado River changed its course). The Kumeyaay, part of the Tipai group, lived in the area of the projects at the time of Spanish contact. These groups lived along permanent waterways until they were forced out by European settlement (O'Leary and Levinson 1991).

3.5.1.2 Historic Period

The first Europeans to explore southern California were the Spanish in the mid-1500s. Extensive exploration did not take place until the establishment of missions on the coast beginning in 1769 (Redlands Institute 2002). The Colorado Desert was an obstacle to avoid during these years of European exploration. The first Spaniard to cross the desert was Juan Bautista de Anza, who crossed a portion of the Colorado Desert in the mid-1770s. European settlement in the California area greatly expanded when gold was discovered in 1849 on the American River near Sutter's Mill. California achieved statehood in the following year. Statehood and gold helped encourage the establishment of railroads into California. The first rail lines into the Salton Basin were laid in 1875. The railroads extended to Yuma in 1877. The introduction of irrigation into the Colorado Desert in 1900 spurred settlement of the region. The towns of Imperial, Silsbery, Calexico, Hester, Holtville, and Brawley all were established by 1904, largely because of the introduction of irrigation to the region. Throughout the 20th century, the Salton Basin has provided rich farmland. Agriculture remains the primary economic activity for the area in the 21st century.

3.5.2 Known Cultural Resources

Five archaeological surveys have been conducted in the project area. The first two were conducted by Cultural Systems Research, Inc., in 1981 and 1982 (Schaefer 1981; Cultural Systems Research, Inc. 1982) and included a part of the existing transmission line ROW. Greenwood and Associates (Greenwood 1983) surveyed areas impacted by construction of the existing line ROW in 1983. WESTEC Services, Inc., also surveyed a portion of the existing ROW area in 1984 (WESTEC Services, Inc. 1984). The fifth survey was conducted by RECON Environmental, Inc., San Diego, California, in 2001, specifically for the proposed projects. RECON examined an approximately 2,150-ft-wide (655-m-wide) corridor that included the 120-ft (37-m) easement for the existing IV-La Rosita line and 1,000 ft (305 m) on either side of this line. BLM has designated the area of the projects an ACEC, partially because of the high density of cultural resources found in the region (BLM 1999).

The surveys identified 26 prehistoric sites and 1 historic site. Nine of these sites had been identified prior to the 2001 survey. The majority of these sites are associated with the late prehistoric period. The area of the projects is located on a portion of the shoreline of Lake Cahuilla. This is the primary reason for the large concentration of sites in such a relatively small area. Most of the sites represent locations where prehistoric peoples were camping along the edge of the lake. Of the 26 prehistoric sites, 23 are recommended as eligible for the NRHP (Berryman and Cheever 2001b). Sites found in the area of the projects include residential bases, field camps, lithic scatters, ceramic scatters, lithic and ceramic scatters, isolate ceramics, and isolate lithics. A single scatter of historic artifacts dating to the 1930s was also identified in the area of the projects, but it was determined that it was not eligible for NRHP listing.

3.6 LAND USE

The proposed transmission line routes are located in Imperial County, California (Figure 3.6-1). The land needed for these projects is owned by the Federal government and managed by BLM. The two 120-ft (37-m) wide and 6-mi (10-km) long ROWs would be located within BLM’s Utility Corridor N in the Yuha Basin portion of the Colorado Desert. The proposed transmission lines would run from the U.S.-Mexico border to the IV Substation.

3.6.1 Imperial County

Imperial County encompasses 4,597 mi^2 (11,906 km^2). It is bordered on the west by San Diego County, on the north by Riverside County, on the east by Arizona, and on the south by Mexico. Roughly 50% of the county is undeveloped. The primary economic activity in the county is agriculture, with nearly 3 million acres (1 million ha) under irrigation. Water for irrigation is drawn from the Colorado River. The Salton Sea, a 381-mi^2 (987-km^2) lake, is located in the northern portion of the county. The New and Alamo Rivers are found in the southern part of the county as well as the All American Canal.

3.6.2 Federal Land

In 1976, the Federal Land Policy and Management Act, Section 601, established the CDCA in southeast California. Roughly 12 million acres (5 million ha) of the 25 million-acre (10 million-ha) CDCA are public lands managed by BLM. Management practices for this area are defined in the CDCA Plan issued in 1980 and amended in 1999 (BLM 1999). The area of the proposed projects is located on a portion of the public land discussed in this plan.

Management practices on public land are defined as multiple use, sustained yield (BLM 1999). This approach attempts to balance the needs and desires of the public with the natural and cultural resources found on the land. Management of the land should allow the public to enjoy the resources in a way that will ensure the survival of the resources for the benefit of future generations.

The CDCA Plan designated 40,069 acres (16,215 ha) known as the Yuha Basin as an ACEC because of the dense concentrations of archaeological sites in this region and because it is the habitat of the flat-tailed horned lizard, a BLM-designated sensitive species. The Yuha Basin ACEC Management Plan (BLM 1981) was developed to describe the management practices for the Yuha Basin ACEC. The boundary for the Yuha Basin ACEC was extended to the U.S.-Mexico border in 1985. This designation as an ACEC provides special land use and management requirements intended to enhance and protect the sensitive cultural and biological resources found in the region. The area of the proposed transmission line projects is located in the Yuha Basin ACEC.

Management practices within the Yuha Basin ACEC include controlled and signed vehicle access, increased field presence, and intensive resource inventories (BLM 1999). The entire Yuha Basin ACEC is designated a Class L (limited) multiple use area in the CDCA Plan. In a limited multiple use area, only low-intensity controlled activities are allowed.

3.6.3 Recreation

The Western Colorado Desert Routes and Travel Designation Plan identifies the recreational activities that are allowed in the Yuha Basin ACEC (BLM 2002). This largely restricts the recreational use of the Yuha Basin ACEC. Travel is allowed on BLM-designated routes only. Routes designated “Limited Use” south of Interstate 8 are restricted to street legal vehicles only. All vehicles are allowed on routes designated “Open.” Parking is permitted adjacent to routes south of Interstate 8 only during daylight hours, except unoccupied vehicles next to the Jacumba Wilderness left by overnight wilderness visitors. Camping is only permitted in designated areas within the Yuha Basin ACEC.

3.6.4 Economic Development

No active sand or gravel mine sites are within the area of the projects. However, two inactive gravel quarries are within the area of the projects south of State Route 98. The closest active mining site is 2.5 mi (4 km) west of the area of the projects (Marty 2003).

As part of the CDCA Plan, several utility corridors were identified. These areas were chosen to guide future development of the nation’s energy system. One of the corridors, Utility Corridor N, is located on the eastern edge of the Yuha Basin ACEC. The IV Substation is located in this corridor. The area of the projects would be located in Utility Corridor N.

3.6.5 U.S. Customs and Border Patrol

The area where the proposed transmission lines would cross the U.S.-Mexico border is patrolled by the U.S. Customs and Border Patrol Division of the U.S. Department of Homeland Security. Activities undertaken in this area by the Border Patrol include surveillance through manned inspection and recently installed cameras for monitoring any activity along the border. Barriers have been erected on roads that cross the border to restrict motorized access across the border. A restriction on development along the border is identified in a 1907 Presidential Proclamation that requires that no construction be allowed along the border that could inhibit the protection or monitoring of the border.

3.6.6 Wilderness

The CDCA Plan also designates Wilderness Study Areas (WSAs). Roughly 2,094,000 acres (850,000 ha) of the CDCA are recommended for WSAs. The nearest WSA to the area of the projects is 15 mi (24 km) to the west, well outside the proposed and the two alternative routes examined in this EIS.

The California Desert Protection Act of 1994 designated some of the WSAs identified in the CDCA Plan as Wilderness areas. The WSA located to the west of the area of the projects was designated as the Jacumba Wilderness under the act.

3.7 TRANSPORTATION

Roads in the vicinity of the proposed and alternative transmission line routes are State Route 98, which runs east-west, crossing the routes, linking Calexico and Ocotillo, and State Route 30, which runs north-south between State Route 98 and Westmorland, parallel to the routes for approximately 2 mi (3 km) (see Figure 1.1-1). Other roads in the area include Interstate 8, which runs from El Centro to San Diego to the west, County Highway 80, which parallels Interstate 8 between El Centro and Ocotillo to the west, and State Route 86, which links El Centro and Brawley to the north.

Table 3.7-1 shows average annual daily traffic flows over these road segments, together with congestion level designations (levels of service). The levels of service designations used in the table were developed by the Transportation Research Board (1985) and range from A to F. Designations A through C represent good traffic operating conditions with some minor delays experienced by motorists; F represents jammed roadway conditions.

3.8 VISUAL RESOURCES

Assessment of the visual resources potentially affected by the transmission lines uses the BLM Visual Resource Management (VRM) System (BLM 1986a,b). These guidelines suggest a number of specific steps to be used in identifying and evaluating the scenic quality along the proposed routes. First, the scenic quality in the area is assessed, followed by the establishment of distance zones at discrete intervals from the proposed routes. Visual sensitivity to changes in the visual environment at key viewing points is then established, together with the likely number of viewers at each of these points. Finally, the relative value of scenic resources based on these

TABLE 3.7-1 Average Annual Daily Traffic in the Vicinity of the Existing Line, 2002

Road Segment	Traffic Volume (average annual daily traffic)	Level of Service[c]
State Route 98	1,900[a]	A
County Highway 29	1,485[b]	A
Interstate 8	12,400[a]	A
County Highway 80	1,005[b]	A

[a] Source: State of California, Department of Transportation (2003).

[b] Source: Jorgenson (2004).

[c] Based on DOE/BLM calculations for this EIS.

factors is used to determine a VRM class for use in defining management objectives for the scenic resources in the area through which the proposed lines would pass.

3.8.1 Scenic Quality

The scenic quality of the area through which the proposed and alternative routes would pass was rated according to BLM VRM inventory guidelines (BLM 1986a,b). These guidelines classify discrete areas as A (lands of outstanding or distinctive diversity or interest), B (lands of common or average diversity or interest), or C (lands of minimal diversity or interest), on the basis of their landforms, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications.

The area through which the proposed transmission lines would pass primarily consists of open expanses of desert with generally flat topography and few landscape features, and is largely indistinguishable from large parts of the surrounding area to the north, south, and west. Although the adjacent scenery does enhance the scenic quality of the area through which the transmission lines would be built, mainly through its expansiveness, none of the landscape features in the area could be considered unique within the topographic region in which the proposed lines would be located. Vegetation in the area consists of fairly homogenous desert scrub; a tree line about a mile to the east of where the proposed lines would be built is the most notable vegetation feature in the area. The most notable topographic features are the Coyote and Jacumba Mountains to the west (Figure 1.1-1). On the basis of these descriptors, the scenic quality of the area through which the proposed lines would pass can be rated Class B, indicating that the area is of common scenic value.

3.8.2 Distance Zones

As changes in form, line, color, and texture associated with changes in scenic quality become less perceptible with increasing distance to viewers, the distance zone in which the projects would be readily perceptible has an important influence on their overall impact. Distance zones, as defined in the BLM VRM system, were used to classify the proposed transmission line routes. The combined area of the foreground-middleground zones is the area between the viewer and a distance of 3 to 5 mi (5 to 8 km); the background zone includes the area 3 to 5 mi (5 to 8 km) from the viewer up to 15 mi (24 km) (Figure 3.8-1). In addition, a seldom seen zone is defined as the area more than 15 mi (24 km) beyond any given viewing point. The viewing zone for the proposed lines is limited to the area near State Route 98. Because of the low, sparse, and fairly uniform vegetation and featureless topography, the proposed lines would only be visible in the foreground-middleground distance zone.

3.8.3 Visual Sensitivity

Public concern for change in scenic quality along the proposed transmission line routes was measured in terms of high, medium, or low sensitivity to changes in the landscape from two key observation points (Figures 3.8-2 and 3.8-3). Sensitivity ratings for the proposed routes, as defined in the BLM VRM system, take into account the type of user, the amount of use, the level of public interest and adjacent land uses, and viewer duration.

The proposed transmission lines would be located in an isolated area with a relatively low level of recreational use and few local residents (Figures 3.8-2 and 3.8-3). Other local activities are limited to agriculture, transportation, and electricity transmission facilities. None of the highways in the vicinity of the transmission line routes are designated as "scenic highways." (State of California, Department of Transportation 2004.) Since there are few viewers in the area likely to be sensitive to changes in visual quality and because the area lacks unique landscape features, the visual sensitivity of the area of the projects can be classified as low.

3.8.4 Visual Resource Management Classes

The BLM uses four VRM classes to manage visual resources:

- Class I is typically designated to protected areas and allows for ecological changes and only very limited management activity, with a view to preserving the existing landscape. The level of change allowed for should be very low and not attract attention.

FIGURE 3.8-2 View from Key Observation Point 1, 0.7 mi (1.13 km) East of Existing IV-La Rosita Line on State Route 98

FIGURE 3.8-3 View from Key Observation Point 2, 1.3 mi (2.1 km) East of Existing IV-La Rosita Line on State Route 98

- Class II aims to retain the existing elements of a landscape, with changes repeating the basic elements of form, color, and texture found in the most important landscape features. Landscape management activities should not be evident, with the level of change maintained at a low level. Any visible contrast with the characteristic landscape should not attract attention.

- Class III aims for partial retention of the existing landscape with only moderate changes allowed in the characteristic landscape. Contrast with the characteristic landscape may be evident and should begin to attract attention; changes should remain subordinate within the existing visual landscape.

- Class IV includes activities that lead to significant modification of the existing character of the landscape. The level of change may be high, and contrasts may attract attention and are likely to be a visible feature of the landscape. Landscape management should attempt to minimize the impact of contrasting activities through the careful location of activities and minimal disturbance.

Some mitigation of impacts through the repetition of elements of the characteristic landscape may be required.

On the basis of analysis of scenic quality, distance zones, and visual sensitivity, the BLM-managed lands within which the transmission lines would be located can be classified as Class III.

3.9 SOCIOECONOMICS

A region of influence (ROI) encompassing Imperial County was used to describe socioeconomic conditions for the area of the projects. The ROI is based on the residential locations of construction and operations workers directly related to transmission line activities and captures the area in which these workers would spend their wages and salaries. The ROI is used to assess the impacts of site activities on employment, income, and housing. Since it is assumed that construction of the lines would require no permanent in-migration of workers, there would be no impacts on population, community services, and community fiscal conditions. Because there may be some short-term relocation of workers during construction, the impacts on temporary housing within the county are assessed.

3.9.1 Population

A large proportion (77%) of the population of Imperial County (142,361 in 2000) is located in incorporated places in the Imperial Valley (U.S. Bureau of the Census 2001a), a region of irrigated agricultural land in the south-central part of the county. Over the period 1990 to 2000, the population in the county grew at an average annual rate of 2.7%, significantly higher than the annual state rate of 1.3%. Within Imperial Valley, the majority of the population is located in three incorporated places — El Centro (population of 37,835 in 2000), Calexico (27,109), and Brawley (22,052) (see Figure 1.1-1). Smaller communities in the Valley include Imperial (7,560), Calipatria (7,289), and Westmorland (2,131) (U.S. Bureau of the Census 2001a). Average annual population growth rates in El Centro and Brawley ranged from 1.5 to 2% over the period 1990 to 2000; growth rates in Calexico were slightly higher at 3.8% per year.

3.9.2 Employment

Irrigated agriculture is one of the dominant economic activities in the county, employing 9,100 people, nearly 28% of total county employment (Table 3.9-1). The most important crops include alfalfa, cotton, sugar beets, wheat, lettuce, carrots, and cantaloupes (USDA 1999). Services (9,350 people employed) and wholesale and retail trade (8,200 people employed) dominate the nonagricultural portion of the economy; activities in these industries contribute to more than 53% of total employment in the county.

TABLE 3.9-1 County Employment by Industry, 2001

Sector	Employment	% of County Total
Agriculture[a]	9,078	27.6
Mining	175	0.5
Public utilities	291	0.9
Construction	1,479	4.5
Manufacturing	1,588	4.8
Transportation and warehousing	1,274	3.9
Trade	8,199	24.9
Finance, insurance, and real estate	1,416	4.3
Services	9,348	28.4
Total	32,888	

[a] 1997 data (USDA 1999).

Source: U.S. Bureau of the Census (2001b).

3.9.3 Unemployment

Unemployment in the county has steadily declined during the late 1990s from a peak rate of 6.9% in 1993 to the current rate of 4.9% (Table 3.9-2) (U.S. Bureau of Labor Statistics 2003). Unemployment in California currently stands at 6.6%.

TABLE 3.9-2 County Unemployment Rates

Period	Rate (%)
Imperial County	
1992–2002 Average	5.2
2003 (current rate)	4.9
California	
1992–2002 Average	7.0
2003 (current rate)	6.6

Source: U.S. Bureau of Labor Statistics (2003).

3.9.4 Income

Personal income in Imperial County stood at almost $2.7 billion in 2001 (in 2003 dollars) and is expected to remain at $2.7 billion in 2003 (Table 3.9-3). Personal income grew at an annual average rate of growth of 0.7% over the period 1990 to 1999. With population growth exceeding income growth in the 1990s, county personal income per capita fell over the period from $22,940 in 1990 to $18,588 in 2001.

TABLE 3.9-3 County Personal Income (2003 dollars)

Parameter	1990	2001	Average Annual Growth Rates 1990–2001	2003[a]
Total personal income ($ millions)	2,507	2,717	0.7%	2,700
Personal income per capita ($)	22,940	18,588	-1.9%	17,573

[a] DOE/BLM projections.

Source: U.S. Department of Commerce (2003).

3.9.5 Housing

Housing in the county showed modest growth over the period 1990 to 2000, growing at 1.8% per year (Table 3.9-4). More than 7,300 new units were added to the existing housing stock during this period, with an additional 3,600 expected by 2003. Vacancy rates in 2000 stood at 10.2% for all types of housing. On the basis of annual population growth rates, more than 47,500 housing units are expected in the county in 2003, of which more than 2,000 would be vacant rental units available to transmission line construction workers. Of these 2,000, 300 would be seasonal-recreational and temporary housing.

3.10 MINORITY AND LOW-INCOME POPULATIONS

E.O. 12898 (February 16, 1994) formally requires Federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs them to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority and low-income populations.

The analysis of potential environmental justice issues associated with the proposed transmission lines followed guidelines described in the CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ 1997a). The analysis method has three parts: (1) a description of the geographic distribution of low-income and minority populations in the affected area is undertaken; (2) an assessment of whether the impacts of construction and operation of the transmission lines would produce impacts that are high and adverse; and (3) if impacts are high and adverse, a determination is made as to whether these impacts disproportionately impact low-income or minority populations. Information on item (1) is provided in this section. Information on items (2) and (3) is provided in Section 4.12.

TABLE 3.9-4 County Housing Characteristics

Type of Unit	1990	2000	2003[a]
Owner-occupied	18,907	22,975	24,900
Rental	13,935	16,409	17,800
Total unoccupied units	3,717	4,507	4,900
Total units	36,559	43,891	47,500

[a] DOE/BLM projections.

Sources: U.S. Bureau of the Census (1994, 2001a).

A description of the geographic distribution of minority and low-income population groups was based on demographic data from the 2000 Census (U.S. Bureau of the Census 2001a). The following definitions were used to identify low-income and minority populations:

- **Minority.** Persons are included in the minority category if they identify themselves as belonging to any of the following racial groups: (1) Hispanic; (2) Black (not of Hispanic origin) or African American; (3) American Indian or Alaska Native; (4) Asian, Native Hawaiian, or Other Pacific Islander.

  Beginning with the 2000 Census, where appropriate, the census form allows individuals to designate multiple population group categories to reflect their ethnic or racial origin. In addition, persons who classify themselves as being of multiple racial origin may choose up to six racial groups as the basis of their racial origins. The term minority includes all persons, including those classifying themselves in multiple racial categories, except those who classify themselves as not of Hispanic origin and as White or "Other Race" (U.S. Bureau of the Census 2001a).

  The CEQ guidance proposes that minority populations should be identified where either (1) the minority population of the affected area exceeds 50%, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

  This EIS applies both criteria in using the Census Bureau data for census block groups, wherein consideration is given to the minority population that is both over 50% and 20 percentage points higher than in the county (the reference geographic unit).

- **Low-Income.** Individuals who fall below the poverty line threshold. The poverty line threshold takes into account family size and age of individuals in the family. In 1999, for example, the poverty line for a family of five with three children below the age of 18 was $19,882. For any given family below the poverty line, all family members are considered as being below the poverty line for the purposes of analysis (U.S. Bureau of Census 2001a).

  The CEQ guidance proposed that a low-income population exists where the percentage of low-income persons in any geographic unit is more than 20 percentage points higher than in the reference geographic unit. A low-income population also exists in any geographic unit where the number of low-income persons exceeds 50% of the total population.

Data in Table 3.10-1 show the minority and low-income composition of the total population for Imperial County on the basis of 2000 census data and CEQ guidelines. Individuals identifying themselves as Hispanic or Latino are included in the table as a separate entry. However, because Hispanics can be of any race, this number also includes individuals

TABLE 3.10-1 Minority and Low-Income Population Characteristics in Imperial County

Parameter	Imperial County
Total population	142,361
White	28,768
Total minority	113,593
Hispanic or Latino	102,817
Not Hispanic or Latino	10,776
One race	9,502
Black or African American	5,148
American Indian and Alaska Native	1,736
Asian	2,446
Native Hawaiian and other Pacific Islander	75
Some other race	97
Two or more races	1,274
Total low-income	29,681
Percent minority	79.8%
Percent low-income	22.6%

Source: U.S. Bureau of the Census (2001a).

identifying themselves as being part of one or more of the population groups listed in the table. Almost 80% of the total county population can be classified as minority, with almost 23% in the low-income category.

The geographic distributions of minority and low-income populations in Imperial County are shown in Figures 3.10-1 and 3.10-2. A large majority of census block groups in the county were more than 50% minority in 2000, although none had a percent minority more than 20 percentage points higher than the county average. Only a small number of census block groups in the county had a percent low-income more than 20 percentage points higher than the county average in 2000; one block group was more than 50% low-income in 2000.